



**US Army Corps
of Engineers**

Construction Engineering
Research Laboratory

CERL Special Report 99/52
June 1999

Technical Review of the Economic Development Conveyance for Defense Distribution Depot Memphis, Tennessee

Jeffrey J. Bogg, Samuel L. Hunter, Jane E. DeRose, Jeffrey G. Kirby, David T. McKay,
Jonathan D. Trucano, Michael Rubenacker, and Shawn R. Hill



In 1993 President Clinton requested that Congress provide new authority to expedite the reuse of military bases adversely affected by Base Realignment and Closure (BRAC) actions. The result was a new property transfer method, called an Economic Development Conveyance (EDC), which gives greater flexibility to the Department of Defense (DoD) and affected communities to negotiate a mutually beneficial property transfer.

On 23 March 1998, the Memphis Depot Redevelopment Authority filed an EDC Application for transfer of the Defense Distribution Depot, Memphis, a U.S. Army installation slated in 1995 for closure under BRAC. The U.S. Army Construction Engineering Research Laboratory was tasked by Headquarters, U.S. Army Corps of Engineers to (1) review the EDC Application for compliance with DoD rules implementing the Federal EDC policy, (2) analyze the findings, and (3) report to the sponsor.

Approved for public release; distribution is unlimited.

ERIC QUALITY INSPECTED 4

The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products. The findings of this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

DESTROY THIS REPORT WHEN IT IS NO LONGER NEEDED

DO NOT RETURN IT TO THE ORIGINATOR

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave Blank)

2. REPORT DATE
June 1999

3. REPORT TYPE AND DATES COVERED
Final

4. TITLE AND SUBTITLE

Technical Review of the Economic Development Conveyance for Defense Distribution Depot Memphis, Tennessee

5. FUNDING NUMBERS

MIPR
8ACERB3003

6. AUTHOR(S)

Jeffrey J. Bogg, Samuel L. Hunter, Jane E. DeRose, Jeffrey G. Kirby, David T. McKay, Jonathan D. Trucano, Michael Rubenacker, and Shawn R. Hill

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Construction Engineering Research Laboratory (CERL)
P.O. Box 9005
Champaign, IL 61826-9005

8. PERFORMING ORGANIZATION
REPORT NUMBER

SR 99/52

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Corps of Engineers (USACE)
CERE-C
20 Massachusetts Avenue, NW.
Washington, DC 20314-1000

10. SPONSORING / MONITORING
AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

Copies are available from the National Technical Information Service, 5385 Port Royal Road, Springfield, VA 22161.

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

In 1993 President Clinton requested that Congress provide new authority to expedite the reuse of military bases adversely affected by Base Realignment and Closure (BRAC) actions. The result was a new property transfer method, called an Economic Development Conveyance (EDC), which gives greater flexibility to the Department of Defense (DoD) and affected communities to negotiate a mutually beneficial property transfer.

On 23 March 1998, the Memphis Depot Redevelopment Authority filed an EDC Application for transfer of the Defense Distribution Depot, Memphis, a U.S. Army installation slated in 1995 for closure under BRAC. The U.S. Army Construction Engineering Research Laboratory was tasked by Headquarters, U.S. Army Corps of Engineers to (1) review the EDC Application for compliance with DoD rules implementing the Federal EDC policy, (2) analyze the findings, and (3) report to the sponsor.

19990628 027

14. SUBJECT TERMS

Economic Development Conveyance (EDC) Memphis, TN
Defense Distribution Depot Memphis Base Realignment and Closure (BRAC)
economic impact market research

15. NUMBER OF PAGES
226

16. PRICE CODE

17. SECURITY CLASSIFICATION
OF REPORT

Unclassified

18. SECURITY CLASSIFICATION
OF THIS PAGE

Unclassified

19. SECURITY CLASSIFICATION
OF ABSTRACT

Unclassified

20. LIMITATION OF
ABSTRACT

SAR

USER EVALUATION OF REPORT

REFERENCE: CERL Special Report 99/52, *Technical Review of the Economic Development Conveyance for Defense Distribution Depot Memphis, Tennessee*

Please take a few minutes to answer the questions below, tear out this sheet, and return it to CERL. As user of this report, your customer comments will provide CERL with information essential for improving future reports.

1. Does this report satisfy a need? (Comment on purpose, related project, or other area of interest for which report will be used.)

2. How, specifically, is the report being used? (Information source, design data or procedure, management procedure, source of ideas, etc.)

3. Has the information in this report led to any quantitative savings as far as manhours/contract dollars saved, operating costs avoided, efficiencies achieved, etc.? If so, please elaborate.

4. What is your evaluation of this report in the following areas?

a. Presentation: _____

b. Completeness: _____

c. Easy to Understand: _____

d. Easy to Implement: _____

e. Adequate Reference Material: _____

f. Relates to Area of Interest: _____

g. Did the report meet your expectations? _____

h. Does the report raise unanswered questions? _____

i. General Comments. (Indicate what you think should be changed to make this report and future reports of this type more responsive to your needs, more usable, improve readability, etc.)

5. If you would like to be contacted by the personnel who prepared this report to raise specific questions or discuss the topic, please fill in the following information.

Name: _____

Telephone Number: _____

Organization Address: _____

6. Please mail the completed form to:

Department of the Army
CONSTRUCTION ENGINEERING RESEARCH LABORATORY
ATTN: CEERD-IM-IT
P.O. Box 9005
Champaign, IL 61826-9005

Executive Summary

Adverse Economic Impact of the Closure on the Region and the Potential for Recovery After the EDC (Chapter 1)

The impact analysis presented in the Economic Development Conveyance (EDC) Application suffers from a series of theoretical and practical limitations that overstate the socioeconomic impacts. The first weakness in the application methodology relates to the choice of an overly broad region of impact (ROI). In addition, the economic impacts are likely to have been overstated due to a lack of consideration given to job replacement efforts in the determined ROI, and the region's low unemployment and subsequent likely capacity to rapidly absorb displaced workers.

Specifically, the Memphis Depot Redevelopment Agency (MDRA) estimated that total detrimental impacts are expected to be on the order of 3,349 direct and indirect jobs, accounting for \$95 million in total output. By contrast, U.S. Army Construction Engineering Research Laboratory (CERL) determined that impacts would likely amount to 1,916 direct and indirect jobs, or \$69.5 million in total output. In any case, even under the most conservative assumptions, a full economic recovery from the closure of Defense Distribution Depot, Memphis, Tennessee (DDMT) will be likely, particularly given the relative insignificance of the closure on the regional economy.

Extent of Long-Term Job Creation (Chapter 2)

CERL's analysis of potential long-term job creation suggests that about 4,700 direct and about 11,300 total jobs will eventually be created as a result of the DDMT EDC. CERL assumed that the MDRA's job creation estimate of 4,572 was presented as a direct onsite estimate. This assumption was necessary because the EDC Application failed to identify the underlying assumptions and corresponding calculations it used to develop projections. Since the MDRA failed to present analytical support and qualitative justification for its projections, CERL was unable to determine whether these projections were generated in a methodologically sound manner.

Overall, the major discrepancy between the estimates by MDRA and CERL probably resulted from a failure to consider indirect employment effects, which therefore resulted in an understatement of total job creation. Nevertheless, the number of jobs that will potentially be created from the EDC after 4 years alone fully mitigates the projected impacts that will likely result from the 1995 BRAC decision. Moreover, at full build-out, CERL's analysis indicates that the realization of a large, positive net gain in employment for the region will likely be realized.

EDC Application's Consistency with the Overall Redevelopment Plan (Chapter 3)

After reviewing the MDRA's EDC Application and the May 1997 Memphis Depot Redevelopment Plan, CERL finds that the application is generally consistent with the goals, objectives, and implementation strategies set forth in the Redevelopment Plan. Discrepancies do exist, however, in the job generation figures, and the allocation of capital improvement costs within the business plan. Despite these inconsistencies, the application creates an environment in which goals and objectives articulated in the Redevelopment Plan can be achieved.

Business Plan Review and Market and Financial Feasibility Analysis (Chapter 4)

The MDRA is requesting an EDC to acquire approximately 495 acres of the 642-acre DDMT. The MDRA's Business Plan tenuously demonstrates financial feasibility and actually makes no direct offer of consideration to the Army. While their Business Plan presents a negative valuation, CERL has been able to enhance the value of the Business Plan through development of its alternate scenarios and correction of errors made by the MDRA in its valuation methodology. The net present value (NPV) of the Business Plan for the 15-yr project analysis period, as estimated by the MDRA, was calculated to be *negative* \$19.7 million under the discounted cash flow method and *negative* \$40.9 million under the income approach method. CERL's developed alternative scenarios for the Business Plan produced an NPV range of *positive* \$3.1 million to *positive* \$8.0 million.

The applicant's Business Plan is based on developing a modern, marketable, light industrial park with distribution/service (51 percent) and light manufacturing (49 percent) through the reuse of DDMT warehouse buildings. They

also develop 161 acres for future light industrial development. Key components and assumptions of the MDRA's Business Plan include:

- 1,850,485 SF of distribution/service absorption, of which 97.5 percent is to be absorbed within the first 6 years of the 15-yr projection period.
- 1,759,904 SF of light manufacturing, of which 1,440,921 SF (81.9 percent) is absorbed during the 15-yr projection period.
- development of 161 acres, 125 of which are in the west end of the Depot for future light industrial development.
- 15-yr effective gross revenues of \$80.3 million, the majority of which are derived from the leasing of existing DDMT space and the balance comprising common area maintenance fees and other revenues.
- 15-yr projected operating expenses totaling over \$28.0 million, the majority of which stem from building and common area maintenance.
- To attract and support the projected development with the existing DDMT warehouse buildings, the MDRA has programmed over \$42.6 million in building and infrastructure improvements over the 15 years. The largest single improvement is the infrastructure related to roads, parking lots, and utilities. The other notable area is for building improvements and demolition.
- The MDRA proposes to finance through bond funds advanced by the City of Memphis and Shelby County, with resulting debt service to be paid with lease revenues.
- Sale of DDMT to a private investor is assumed for Year 15 resulting in a one-time cash flow that is applied to the NPV of project cash flows.

CERL developed two alternate scenarios based on information obtained during its review of the MDRA's Business Plan and its market analysis, site visit, and discussion with local real estate brokers who were familiar with both the Depot site and the Memphis market.

The CERL1 scenario represents three supportable project assumption changes that enhance the overall financial feasibility of the MDRA's Business Plan. First, CERL has made a methodological change to the MDRA's Business Plan by including a reversion value at Year 15 with the assumption that the project is

sold. Finally, CERL has developed an estimate of required capital improvements significantly less than that developed by the MDRA but which, in CERL's opinion, allows the MDRA to redevelop in accordance with its Business Plan. The result of these changes to the MDRA's Business Plan is to increase the valuation to a range of \$3.1 million to \$6.0 million.

The CERL2 scenario makes the same adjustments as those in the CERL1 scenario, adding the assumption that the 125 acres developed in the west end of the Depot are fully absorbed over the 15-yr projection period. This assumption increases revenues by over \$4.5 million more than the CERL1 scenario over the 15-yr projection period. CERL's market analysis supports the development of this assumption due to the demand for land parcels in the sizes as developed by the MDRA, according to discussions held with real estate brokers familiar with the Depot site and the Memphis industrial market. The result of these changes to the MDRA's Business Plan is to increase the valuation to a range of *positive* \$4.8 million to *positive* \$8.0 million.

Need and Extent of Proposed Infrastructure Improvements (Chapter 5)

The MDRA proposes a total of \$42.6 million for DDMT infrastructure improvements. The target industries for the site are light industry, manufacturing, distribution, and community development. The CERL estimate for the same scope of work lies between \$40.6 million and \$49.3 million. Therefore, it may be concluded that the MDRA's estimate of the cost for its proposed work is reasonable. However, the CERL findings regarding the need and extent of improvements that are required to meet community standards and support projected capacity levels required for its designated usage range from \$29.0 million to \$36.0 million.

Based on these need and extent findings, CERL concludes the \$42.6 million projected by the MDRA for DDMT infrastructure improvements is high. The major differences between the MDRA's preferred alternative and the CERL scenario is seen in the scopes of work. Where the MDRA calls for 100 percent replacement of most utilities (e.g., water distribution, fire suppression, or telecommunications), the CERL scenario specifies only partial replacement and upgrades. Estimates for roads and parking lots are closer to agreement than utilities but still appear high. Estimates for building enhancements are in agreement. CERL notes that most improvements are specified in very general terms making explicit comparisons difficult.

Extent of State and Local Investment and Risk (Chapter 6)

The level of investment and scope of redevelopment planned for DDMT is substantial, totaling over \$42.6 million, according to MDRA estimates. The CERL1 scenario programs only \$36.0 million in capital investment, improving the prospects for risk management and financial feasibility through independently supportable assumptions that create a net positive impact on 15-yr cash flows.

Local and Regional Real Estate Market Conditions (Chapter 7)

In general, CERL confirms the market analysis and findings presented in the MDRA's Reuse Plan and EDC Application. Driven by the strength of the regional economy, the region's comparative advantage as a distribution center, and other contributing factors, the real estate market in the Memphis Metropolitan Region is continuing to experience sustained growth. The DDMT site offers a unique location within the Midtown submarket given its proximity to the Memphis International Airport and larger Airport/Southeast submarket to the southwest. Although DDMT faces substantial competition from alternative development sites, given the current strength of the regional market, as well as DDMT's comparative advantage for lower cost reuse, CERL supports the MDRA's market feasibility findings.

In summary, based on CERL's independent third-party review of Memphis industrial real estate market trends, and in consideration of the strengths of the EDC offering in terms of location, reusable buildings, public investment, and tax advantages, CERL concludes that a reasonable level of market demand will likely exist for EDC real estate products over the 15-yr pro forma. Thus, neither the Memphis real estate market, nor the DDMT site itself, poses any major foreseeable limitations to the timely redevelopment and job creation as proposed in the Reuse Plan.

Army Disposal Plan, Other Federal Agency Concerns, and Other Property Disposal Authorities (Chapter 8)

As part of the EDC Application review process adopted by the BRAC office at HQUSACE and presented at a Corps of Engineers Real Estate Workshop in Denver, CO, in December 1995, CERL has been asked to defer comment on these issues to the Real Estate Directorate at HQUSACE and the Corps of Engineers, Mobile District. In addition, both the negotiation process leading up to the

submittal of the formal EDC Application and review of the legal environment related to real and personal property are beyond the scope of CERL's technical review.

Economic Benefit to the Federal Government (Chapter 9)

Based on the eligibility factors/criteria reviewed for this report, it is the opinion of CERL that the applicant is eligible for an EDC. CERL recommends that the Army consider up to \$3.1 million in facility layaway and annual maintenance and repair (M&R) costs when negotiating the final terms and conditions of the conveyance. It is also the recommendation of CERL that the Army look favorably upon the MDRA's level of investment — which will likely create over 4,500 jobs — when deciding if a discount from fair market value (FMV) is warranted. Finally, CERL's estimated range of business plan value is *positive* \$3.1 – \$8.0 million, which contrasts markedly with the MDRA's estimated market value range of *negative* \$20 – \$40 million, but the Army's final determination of value and possible consideration must rest largely on the results of a negotiation process between the Army and the MDRA, as well as the results of the Corps of Engineers' fair market value appraisal process.

Review of Application for Completeness (Chapter 10)

CERL concludes that the EDC Application submitted by the MDRA is lacking in certain substantive areas, but is, for the most part, complete. The application includes a complete project narrative, EDC contributions to job creation and economic development, a business plan, justification for use of the EDC process, and a statement of the MDRA's legal authority to acquire and dispose of property. However, justification for a \$0 cost conveyance and proposed terms and conditions of the EDC were absent from the MDRA submission.

Foreword

This study was conducted for and funded through the Base Realignment and Closure (BRAC) Officer, Office of the Assistant Chief of Staff for Installation Management (ACSIM-DAIM-BO) under Military Interdepartmental Purchase Request (MIPR) 8ACERB3003, dated 10 October 1997. The technical monitor was Gary B. Paterson, CERE-C.

The work was conducted by the U.S. Army Construction Engineering Research Laboratory (CERL) by the Business Processes Branch (CN-B) of the Installations Division (CN) and the Engineering Processes Branch (CF-N) and Facilities Maintenance Branch (CF-F) of the Facilities Division (CF). Dr. Moonja Kim is Chief, CN-B, Dr. Michael P. Case is Chief, CF-N, and Mark Slaughter is Chief, CF-F. L. Michael Golish is Chief, CF, and Dr. John Bandy is Chief, CN.

The following CERL employees worked on specific sections of this document: Jeffrey Bogg, CN-B (EDC Project Leader, Business Plan Review and Market and Financial Feasibility, Economic Benefit to the Federal Government, Extent of State and Local Investment and Risk); Samuel Hunter, CF-F, Jeffrey Kirby, CF-N, and David T. McKay, CF-F (Need and Extent of Proposed Infrastructure Improvements); Jane DeRose, CN-B (Demolition and Facility Layaway and M&R); Samuel Hunter and Jeffrey Kirby (Wet Utilities); David McKay (Building Fit-up); Jeffrey Kirby and David McKay (Roads/Road Reconstruction); Shawn Hill and John Trucano, CN-B (Economic Impact Analysis, Job Creation, Reuse Plan Consistency). Also contributing to the report was Mike Rubenacker (ICF Kaiser, Business Plan Review and Market and Financial Feasibility Analysis). The technical editor was Linda L. Wheatley, Information Technology Laboratory.

Dr. Michael J. O'Connor is Director of CERL.

Contents

SF 298.....	1
Executive Summary.....	3
Foreword.....	9
Introduction.....	19
Background	19
Objective	21
Tasking and Approach	21
Units of Weight and Measure	22
1 Adverse Economic Impact of the Closure on the Region and the Potential for Recovery After the EDC	27
Background	27
Methodology	27
Review of EDC Application Assumptions and Methodology	28
Adverse Economic Impact of the Closure of DDMT	31
Potential for Economic Recovery	34
Conclusion.....	34
2 Extent of Long-Term Job Creation.....	35
Overview	35
Background and Approach	35
Process Methodology.....	36
Extent of Long-term Job Creation	36
Methodology	37
Multiplier Calculation	37
Long-term Employment Projections	38
Caveats	39
Reconciliation of Job Creation Projections and Closure Impacts	40
Conclusion.....	41

3	EDC Application's Consistency With the Overall Redevelopment Plan	42
	Background	42
	Conclusions	42
	Inconsistencies Between the Redevelopment Plan and the EDC Application	43
4	Business Plan Review and Market and Financial Feasibility Analysis	45
	Objective	45
	Background	46
	Approach	47
	Business Plan Review and Findings	50
	Financial Feasibility Analysis and Conclusion	66
5	Need and Extent of Proposed Infrastructure Improvements	67
	Objectives	67
	Approach	67
	Overview of LRA Proposal for Reuse of DDMT	70
	CERL Evaluation of MDRA's Preferred Alternative	74
	Conclusions	83
6	Extent of State and Local Investment and Risk	84
	Background	84
	Approach	84
	Operational Investment and Risk	85
	Capital Improvements	86
	Conclusions	88
7	Local and Regional Real Estate Market Conditions	89
	Methodology	89
	Background	89
	Site Configuration	90
	Access	90
	Contiguous Land Uses	91
	Market Analysis	92
	Office Market Summary	95
	Conclusion	98
8	Army Disposal Plan, Other Federal Agency Concerns, and Other Property Disposal Authorities	99

9 Economic Benefit to the Federal Government	100
Introduction.....	100
Conclusions	101
Anticipated Consideration From the EDC	103
Recommendation	104
10 Review of Application for Completeness	105
Appendix A: Caveats, Assumptions, and Employment Multipliers by Standard Industrial Classification Code.....	108
Appendix B: Operations and Business Plan Analyses.....	123
Appendix C: Engineering Analysis.....	141
Distribution	

List of Figures and Tables

Figures

1	Geographical relationship of DDMT with the greater Memphis Region.....	23
2	Immediate vicinity of DDMT site.....	24
3	Memphis Depot Site Plan.....	25
4	Memphis Depot Phasing Plan.....	26
7.1	Spatial relationship and delineation of relevant industrial submarkets to DDMT and Memphis International Airport.....	95

Tables

1.1	Adverse economic impact of DDMT closure.....	33
2.1	Long-term direct and indirect DDMT EDC employment projections.....	37
2.2	Comparison of CERL and MDRA job creation estimates.....	39
4.1	Proposed EDC land uses and existing acreage and building space.....	46
5.1	Summary comparison of MDRA and CERL infrastructure improvement estimates.....	72
7.1	Selected real estate market trends for the Memphis Metropolitan Region.....	94
7.2	Summary of major new and expanded industrial project averages: 1995 - 1998 YTD.....	94
7.3	Office market overview - Memphis Metropolitan Region and selected submarkets.....	97
9.1	One-time layaway cost estimates for the DDMT EDC parcel.....	101
9.2	Annual M&R cost estimates for the DDMT EDC parcel.....	102
9.3	Potential Army layaway and M&R commitments.....	103
B.1	EDC building and land inventory for DDMT.....	124
B.2	Absorption and revenue summary.....	125
B.3	Summary of capital improvements.....	127
B.4	Debt service, Memphis Defense Depot.....	131
B.5	DDMT Business Plan pro forma recast.....	133
B.6	CERL1 Business Plan pro forma summary (without land sales).....	135
B.7	CERL1 Business Plan pro forma summary (with land sales).....	137
B.8	Scenario and sensitivity analysis.....	139

C.1	Cost comparisons for DDMT total.	142
C.2	"Apples to Apples" estimates — Install trees/grass buffer.....	144
C.3	"CERL Scenario" estimates — Install trees/grass buffer.....	144
C.4	"Apples to Apples" Estimates — install wrought iron fence.....	145
C.5	"CERL Scenario" estimates — install wrought iron fence.	145
C.6	"Apples to Apples" estimates — install entrance landscaping.	146
C.7	"CERL Scenario" Estimates — install entrance landscaping.	146
C.8	"Apples to Apples" estimates — install trees/grass of five areas each 25 x 500 x 2 sides.	147
C.9	"CERL Scenario" estimates - install trees/grass of five areas each 10 x 500 x 2 sides.	147
C.10	"Apples to Apples" estimates — install trees/grass.....	148
C.11	"CERL Scenario" estimates - install trees/grass.	149
C.12	"Apples to Apples" and "CERL Scenario" estimates for road signs on G Street and 1st Street, each.	149
C.13	"Apples to Apples" estimates — install new entrance sign.	150
C.14	"CERL Scenario" estimates - Install new entrance sign.....	150
C.15	"Apples to Apples" estimates — Install new secondary entrance sign.	151
C.16	"CERL Scenario" estimates — Install new secondary entrance sign.....	151
C.17	"Apples to Apples" Estimates — video tape sanitary and storm lines.....	152
C.18	"CERL Scenario" estimates — video tape sanitary and storm lines.	152
C.19	"Apples to Apples" estimates — install 1650 LF of new service lines.....	153
C.20	"CERL Scenario" estimates - install 825 lf of new service lines.....	153
C.21	"Apples to Apples" estimates — install 550 lf of new service lines.	154
C.22	"CERL Scenario" estimates — install 550 lf of new service lines.	154
C.23	"Apples to Apples" estimates — replace existing electrical poles (Phase 6). ...	155
C.24	"Apples to Apples" estimates — replace existing electrical poles (Phase 1). ...	155
C.25	"CERL Scenario" estimates — replace existing electrical poles (Phase 1).	156
C.26	"Apples to Apples" estimates — replace existing electrical poles (Phase 5). ...	156
C.27	"CERL Scenario" estimates — replace existing electrical poles (Phase 5).	157
C.28	"Apples to Apples" estimates — install new primary services to buildings (Phase 1).....	157
C.29	"CERL Scenario" estimates — install new primary services to buildings (Phase 1).....	158
C.30	"Apples to Apples" estimates — install new primary services to buildings (Phase 5).....	158
C.31	"CERL Scenario" estimates — install new primary services to buildings (Phase 5).....	159

C.32	"Apples to Apples" estimates — replace transformers to buildings (Phase 1)..	159
C.33	"CERL Scenario" estimates — replace transformers to buildings (Phase 1)....	160
C.34	"Apples to Apples" and "CERL Scenario" estimates — replace transformers to buildings (Phase 5).	160
C.35	"Apples to Apples" estimates — install underground electrical lines (Phase 1)..	161
C.36	"CERL Scenario" estimates — install underground electrical lines (Phase 1)..	161
C.37	"Apples to Apples" estimates — install underground electrical lines (Phase 2)..	162
C.38	"CERL Scenario" estimates — install underground electrical lines (Phase 2)..	162
C.39	"Apples to Apples" and "CERL Scenario" estimates — replace meters to buildings (Phase 1).	163
C.40	"Apples to Apples" and "CERL Scenario" estimates — replace meters to buildings (Phase 2).	163
C.41	"CERL Scenario" estimates — install new natural gas lines (Phase 1).	164
C.42	"CERL Scenario" estimates — install new natural gas lines (Phase 2).	165
C.43	"CERL Scenario" estimates — install new natural gas lines (Phase 3).	166
C.44	"CERL Scenario" estimates — install new natural gas lines (Phase 6).	167
C.45	"Apples to Apples" estimates — install new natural gas lines (Phase 1).	168
C.46	"Apples to Apples" estimates — install new natural gas lines (Phase 2).	169
C.47	"Apples to Apples" estimates — install new natural gas lines (Phase 3).	170
C.48	"Apples to Apples" estimates — install new natural gas lines (Phases 4 and 5).	171
C.49	"Apples to Apples" estimates — install new natural gas lines (Phase 6).	172
C.50	"Apples to Apples" estimates — install underground phone lines (Phase 1)....	172
C.51	"Apples to Apples" estimates — install underground phone lines (Phases 2, 3, and 4).	173
C.52	"Apples to Apples" estimates — Install underground phone lines (Phase 6)....	173
C.53	"CERL Scenario" estimates — install underground phone lines (Phase 1).	174
C.54	"CERL Scenario" estimates — install underground phone lines (Phases 2, 3, and 4).	174
C.55	"Apples to Apples" and "CERL Scenario" estimates — building fit-up.	175
C.56	"Apples to Apples" estimates — Phase 1: Install new domestic water lines....	177
C.57	"CERL Scenario" estimates — Phase 1: Install new domestic water lines....	177
C.58	"Apples to Apples" estimates — Phase 2: Install new domestic water lines....	178
C.59	"CERL Scenario" estimates — Phase 2: Install new domestic water lines....	178
C.60	"Apples to Apples" estimates — Phase 3: Install new domestic water lines....	179
C.61	"CERL Scenario" estimates — Phase 3: Install new domestic water lines....	179
C.62	"Apples to Apples" estimates — Phase 5: Install new domestic water lines....	180
C.63	"CERL Scenario" estimates — Phase 5: Install new domestic water lines....	180

C.64	"Apples to Apples" estimates — Phase 6: Install new domestic water lines.....	181
C.65	"Apples to Apples" estimates — Phase 1: Remove and replace fire hydrants.....	181
C.66	"CERL Scenario" estimates — Phase 1: Remove and replace fire hydrants.....	182
C.67	"Apples to Apples" estimates — Phase 2: Remove and replace fire hydrants.....	182
C.68	"CERL Scenario" estimates — Phase 2: Remove and replace fire hydrants.....	183
C.69	"Apples to Apples" estimates — Phase 3: Remove and replace fire hydrants.....	183
C.70	"CERL Scenario" estimates — Phase 3: Remove and replace fire hydrants.....	184
C.71	"Apples to Apples" estimates — Phase 5: Remove and replace fire hydrants.....	184
C.72	"CERL Scenario" estimates — Phase 5: Remove and replace fire hydrants.....	185
C.73	"Apples to Apples" and "CERL Scenario" estimates — Phase 1: Connect system to remaining buildings/install meters.	185
C.74	"Apples to Apples" and "CERL Scenario" estimates — Phases 2, 3, and 5: Connect system to remaining buildings/install meters.....	186
C.75	Upgrade Boulevard from Gate 1 to new 10th Street extension.	186
C.76	Upgrade 1st from G to K St.....	188
C.77	Construct new road from G Street to 10th.....	190
C.78	Construct new road 10th to South Gate.....	191
C.79	Construction of Western parking lot on G Street.	192
C.80	Construction of Eastern parking lot on G Street.	193
C.81	Upgrade lot on North side of Bldg 144.....	194
C.82	Upgrade lot on East and South side of Bldg 144.....	194
C.83	Widen 4th to 4 lane and extend.	195
C.84	Remove RR ballast and install 50-ft easement.....	196
C.85	Construct new road between J Street and new 10th extension.....	197
C.86	Construct new G Street road between 10th and new 23rd.....	198
C.87	Reconstruct 23rd Street from B to G.....	199
C.88	Reconstruct 10th Street from G Street to Gate 15.....	200
C.89	Upgrade Westside of Koreans.	202
C.90	Construct parking Southside Koreans.	203
C.91	Remove road East section of F Street and East section of D Street (estimate for each of these projects).....	204
C.92	Remove road East section of E Street.....	205

C.93	Estimate to demolish each of the following: 5th Street between C and E Street, 3rd Street between C and E Street, 5th Street between G and E Street, and 3rd Street between G and E Street.	206
C.94	Construct new road from Gate 15 to 2nd Street and redo Gate 21 entrance...207	
C.95	Upgrade 2nd Street.	208
C.96	Construction of new road from 23rd & G to 10th.	209
C.97	Construction of new parking lot in demo typ 20 area.	212
C.98	Repair existing parking lot Gate 1.	213
C.99	Northern perimeter road.	214
C.100	Construction of new parking lot between new road and C Street.	214
C.101	SW-PK-1: Parking storm sewer lines.	216
C.102	SW-PK-1c: Parking storm sewer lines.	216
C.103	SW-PK-2: Parking storm sewer lines.	217
C.104	SW-PK-2c: Parking storm sewer lines.	217
C.105	SW-PK-3: Parking storm sewer lines.	218
C.106	SW-PK-3c: Parking storm sewer lines.	218
C.107	SW-PK-4: Parking storm sewer lines.	219
C.108	SW-PK-4c: Parking storm sewer lines.	219
C.109	SW-PK-5: Parking storm sewer lines.	220
C.110	SW-PK-5c: Parking storm sewer lines.	220
C.111	SW-Pipe-1: R&R pipes and structures.	221
C.112	SW-Pipe-2: Repair perimeter catch basins.	221
C.113	SW-Pipe-3: Replace gutter connections to SW on Type 20s.	222
C.114	SW-Future Dev-1: Changes to system in area for future development.	222
C.115	SW-Phase 6: Create retention pond in Western Dunn field and connect to Eastern side.	223

Introduction

Background

The Defense Depot Memphis, Tennessee (DDMT) Economic Development Conveyance (EDC) parcel comprises approximately 495 acres and 5.6 million SF of building space in Shelby County, Tennessee, in south-central Memphis.* The entire Depot facility is 642 acres. The portions of the Depot property that are not included in the EDC Application are those parcels on the main installation that could be transferred directly to state or local government agencies as Public Benefit Transfers (83 acres), one parcel committed to a local homeless service agency under the approved Homeless Assistance Plan (4 acres), and Dunn Field, which could not be transferred for several years due to extended environmental cleanup (64 acres).

The main installation is bordered by Airways Boulevard on the east, Perry Road on the west, Ball Road to the south, and Dunn Avenue to the north. Airways Boulevard, a six-lane arterial highway, is the most heavily traveled road in the immediate vicinity of DDMT; the main entrance for the site is from Airways through Gate One. Airways Boulevard offers immediate access from DDMT to Interstate-240, which is less than 1 mile south of the site. Most of the area surrounding DDMT is highly developed and can be characterized by a variety of lands uses, including light and heavy industrial, commercial, and residential.

When DDMT was slated for closure by the 1995 Base Realignment and Closure (BRAC) Commission, the City of Memphis and the County of Shelby stepped forward and established the Memphis Depot Redevelopment Authority (MDRA) to facilitate the reuse and economic redevelopment of the surplus parcels. Since the 1995 announcement, the facility has essentially demobilized in preparation for disposal. Figures 1 and 2 illustrate the site's geographic relationship to key

* Refer to Figure 1. All figures are at the end of the chapter.

transportation corridors from regional and local perspectives and the market area, respectively. Figures 3 and 4 are the site and phasing plans, respectively.

The EDC property transfer authority was created as a result of a major new policy to speed the economic recovery of communities adversely affected by military base closures or realignments. On 2 July 1993, President Clinton requested that Congress provide additional authority to expedite the reuse of closing military bases, in an effort to create new jobs and reestablish the economic base. Congress provided this new authority (commonly called the "Pryor Amendments") and subsequent amendments as Title XXIX of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 1994. The Department of Defense (DoD) recently codified the final implementing regulations for this legislation at 32 CFR 90-92, "Revitalizing Base Closure Communities." Collectively, these new rules are intended to facilitate the conveyance (transfer of military real and personal property) from the Federal Government to an approved Local Redevelopment Authority (LRA).

These new regulations created the EDC, which gives greater flexibility to the military departments and affected communities to negotiate the terms and conditions of the conveyance if specified criteria are met. On 23 March 1998, the MDRA, acting as the approved LRA, filed an EDC Application with the Chief of the BRAC Office at Headquarters, U.S. Army Corps of Engineers (HQUSACE), for the conveyance of certain parcels at DDMT. Included as part of the EDC Application was a copy of the DDMT Reuse Plan.

In general, the MDRA has requested that the Army and Defense Logistics Agency (DLA) transfer the EDC parcel over to its authority however; no explicit offer of consideration was identified. Subsequently, the general terms and conditions of the offer remain undisclosed. It is known, however, that the MDRA has valued the EDC property at between *negative* \$20 million and *negative* \$40 million.

The MDRA's EDC Application provides discussion of the required elements under the regulation, but some elements of the EDC Application as presented are not adequately supported or suffer from methodological shortcomings. Despite these limitations, however, the U.S. Army Construction Engineering Research Laboratory (CERL) successfully recasted certain elements of the application, including the EDC Business Plan, and demonstrated economic and financial project feasibility through modifications in scenario development.

Subsequent to the receipt of the application by HQUSACE, CERL was tasked by headquarters to provide a technical review of the MDRA application, evaluating

it for compliance with 32 CFR Part 91 and related regulations. This report comprises CERL's findings and conclusions.

Objective

The objective of this study was to technically evaluate the MDRA's EDC Application in terms of:

1. Validity of the information provided by the MDRA
2. Completeness of the application according to the criteria and factors specified in the DoD regulations governing EDCs.

The objective of this report is to document the study's findings, noting any deficiencies found in the application, and to attempt to address those deficiencies.

Tasking and Approach

Technical review of the MDRA's EDC Application was executed by a multi-disciplinary work group formed and managed through CERL's Planning and Management Laboratory (PL). In anticipation of the EDC Application, the work group conducted a site visit to the DDMT region during the week of 17 May 1998. The purpose of the site visit was to coordinate the application review with DDMT Army Caretaker Force personnel and to collect preliminary source data. Most of the group's analytical work and documentation occurred between May 1998 and August 1998.

Validity of the information provided on the EDC Application was determined by following a protocol specifically developed to demonstrate how the substance of the application meets the criteria in the DoD implementing regulations related to EDCs. Using data provided in the EDC Application and supporting documents, as well as data gathered independently by team members, CERL evaluated the application according to the following criteria and factors:

1. Adverse economic impact of closure on the region and potential for economic recovery after an EDC
2. Extent of job generation

3. Consistency with the overall Redevelopment Plan (i.e., the DDMT Reuse Plan)
4. Financial feasibility of the proposed development, including market analysis, and the need and extent of proposed infrastructure improvements
5. Extent of state and local investment and risk incurred
6. Current local and regional real estate market conditions in the affected area
7. Relationship to the overall Military Department disposal plan for the installation, incorporation of other Federal agency interests and concerns, and applicability of and conflicts with other Federal property disposal authorities
8. Economic benefit to the Federal Government, including protection and maintenance cost savings and anticipated consideration from the transfer.

Another criterion to be reviewed under the EDC implementing regulations is the proposed EDC's compliance with applicable Federal, state, and local laws and regulations. This type of legal review is not addressed in this report as such a review falls beyond the scope of CERL's tasking and expertise.

After evaluating the validity of the information provided in the EDC Application, CERL determined whether the application was complete in terms of the seven criteria specified in the EDC implementing regulations. (These criteria are discussed in Chapter 10, **Review of Application for Completeness.**)

Finally, the CERL work group compiled its findings into this report and a briefing for the sponsor. The final briefing was given to Army decisionmakers on 23 September 1998.

Units of Weight and Measure

U.S. standard units of measure are used throughout this report. A table of metric conversion factors is presented below.

SI conversion factors		
1 in.	=	2.54 cm
1 ft	=	0.305 m
1 SF	=	0.093 m ²
1 cu ft	=	0.028 m ³
1 mi	=	1.61 km

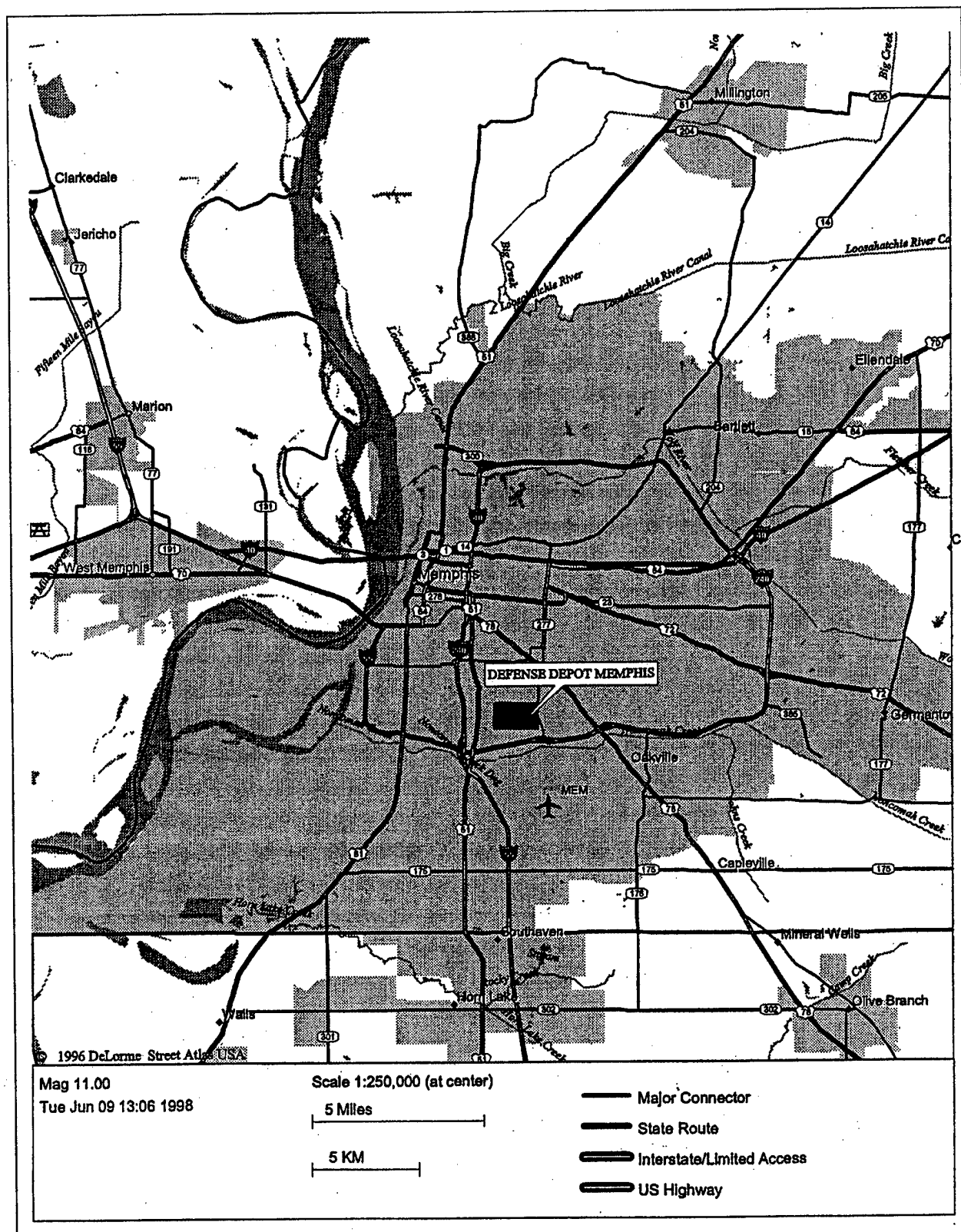


Figure 1. Geographical relationship of DDMT with the greater Memphis Region.

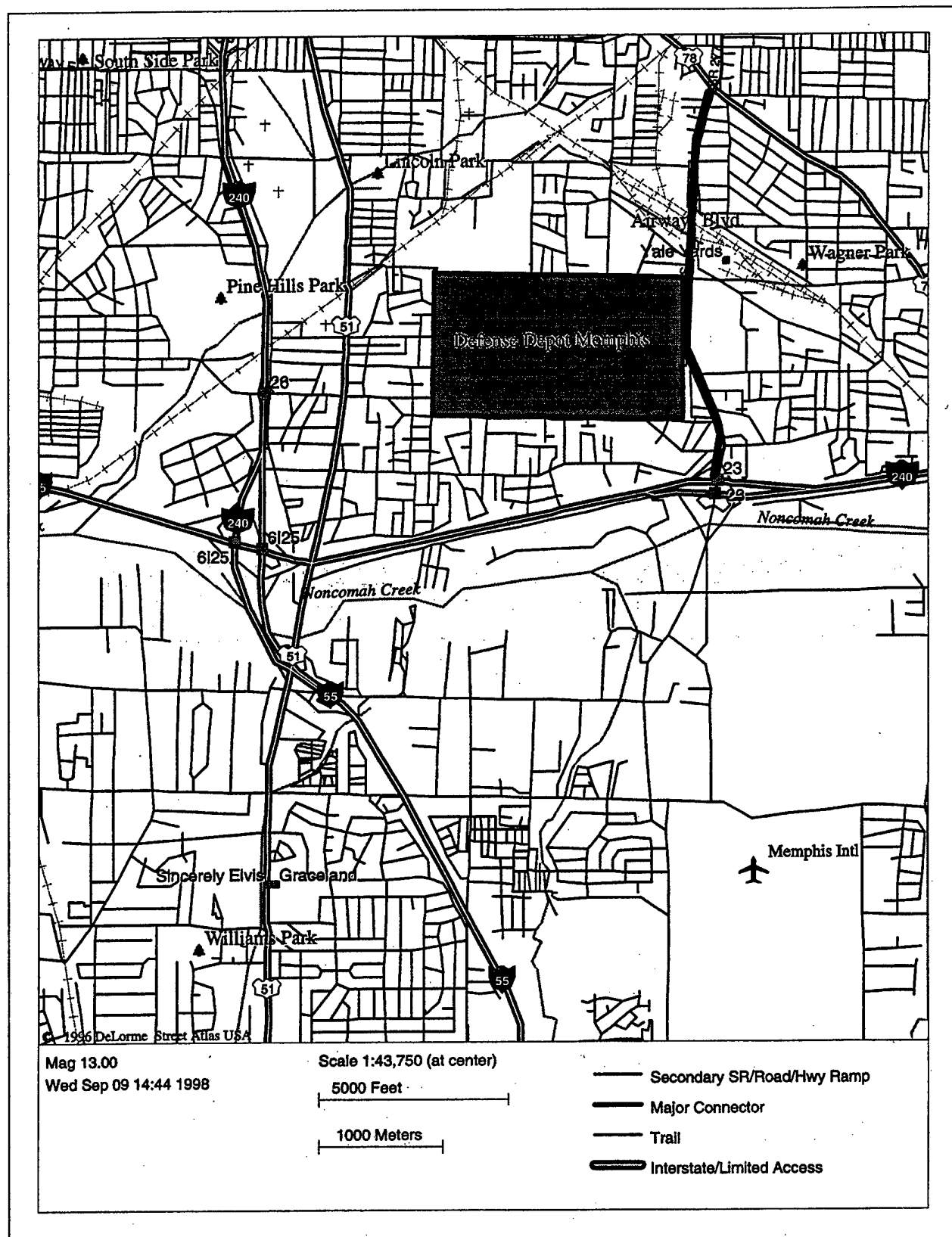


Figure 2. Immediate vicinity of DDMT site.

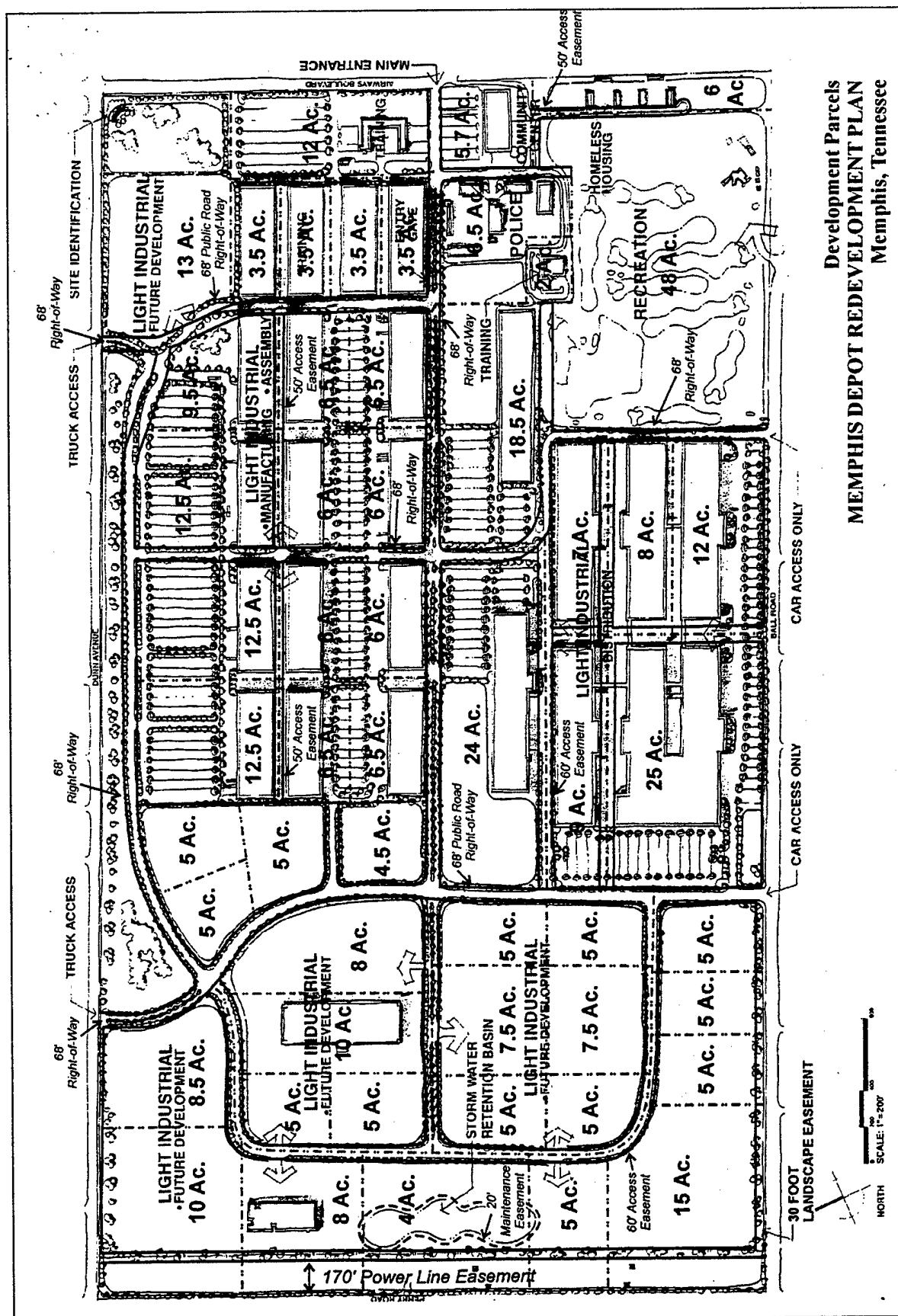


Figure 3. Memphis Depot Site Plan.

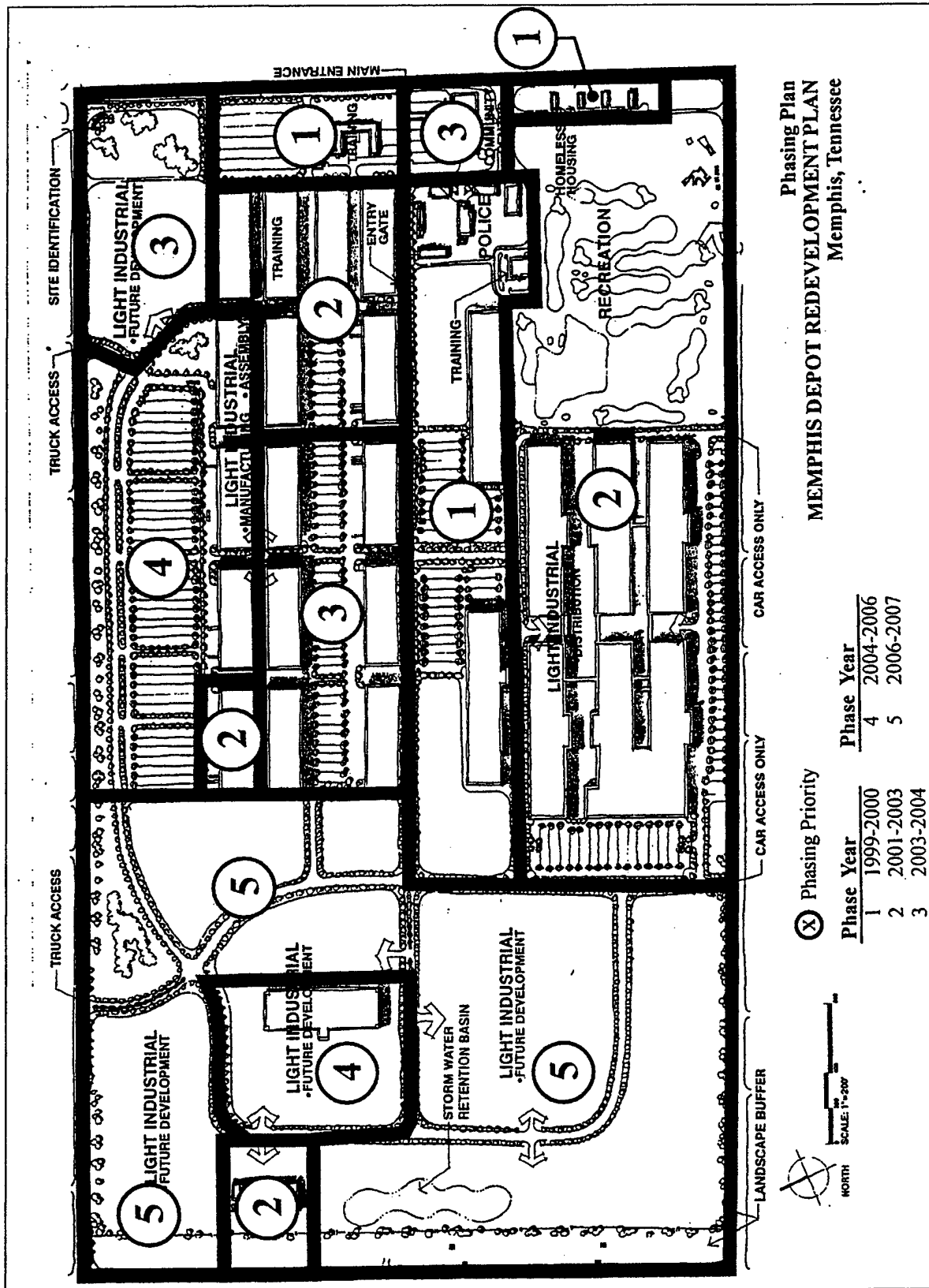


Figure 4. Memphis Depot Phasing Plan.

1 Adverse Economic Impact of the Closure on the Region and the Potential for Recovery After the EDC

Prepared by:

Shawn R. Hill, Community Planner

Jonathan D. Trucano, Community Planner

CERL, ATTN: CN-B

P. O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511

Background

Pursuant to 32 CFR §175, the prescribed content of the EDC Application must include a description of the economic impact of a base closure on affected communities. This chapter addresses these concerns by examining the extent of closure impacts and whether the proposed conveyance of DDMT will facilitate a recovery of lost jobs and revenues.

Methodology

To determine economic impacts from the closure of DDMT, CERL first reviewed the DDMT EDC Application, the May 1997 Reuse Plan, the U.S. Army Final Environmental Assessment (FEA), and other referenced documents to determine the extent of the adverse economic impact experienced in the Memphis region as a result of the closure. CERL found that, while these documents describe some of the adverse impacts that have resulted from the closure, they do not present a sufficiently comprehensive socioeconomic analysis of possible closure and reuse scenarios to make a cogent determination.

Accordingly, CERL conducted an independent analysis for evaluating the DDMT EDC Application. Initially, CERL examined the assumptions and methodologies

used to develop the impact estimates in the EDC Application for their internal consistency and appropriateness. In addition, CERL examined the state and condition of the local, regional, and national economy to identify factors originating both internally and externally to the DDMT area. These factors may potentially influence the economy's capacity to withstand and recover from the anticipated closure impacts. Finally, CERL developed independent estimates of the likely impacts of the closure. In developing these independent estimates, CERL relied primarily on Implan Pro v1.1, a software program that uses a standard input-output modeling methodology to generate impact multipliers from county-level economic data. Implan Pro has been used extensively by private and public entities to quantify positive and negative economic effects that may result from a wide array of investment scenarios, including the closure of military bases.

Review of EDC Application Assumptions and Methodology

The calculation of aggregate closure impacts depends upon a series of underlying assumptions, the nature of which will individually affect the final impact estimate to varying extents. Thus, in conducting its review, CERL is forced to verify the validity of such underlying assumptions, since these assumptions can ultimately influence the outcome of the analysis. CERL's review of the economic impact estimates presented in the DDMT EDC Application suggests that the assumptions and corresponding estimates presented suffer from a series of methodological shortcomings in the choice of region of impact (ROI), the effect of job placement efforts, and the regional employment trends. As described in the next few sections, it appears that the net closure impact estimates were calculated inappropriately.

Choice of Region of Impact

The first weakness in the application methodology relates to the choice of an overly large ROI, which ultimately dilutes estimated closure impacts. An ROI is a geographic area selected as a basis on which social and economic impacts of project alternatives are analyzed. It is important to realize that any given economic effect depends upon a series of simplifying assumptions. Accordingly, the choice of an ROI can have a significant impact on the results of a socio-economic analysis; more specifically, an overly large ROI tends to understate important regional economic interrelationships, and thus incorrectly to diminish potential local impacts.

The 1997 Reuse Plan identified the five-county Memphis Metropolitan Statistical Area (MSA) as the primary region of economic and market influence for DDMT.* Alternatively, given the particular dynamics of the Memphis economy, in analyzing the socio-economic closure impacts of DDMT, CERL identified Shelby County as the singular constituent of the ROI. The Army's FEA also recognized this fact and defined a similar primary ROI in conducting its analysis.†

The criteria used to determine an ROI are (1) residency distribution of installation employees, (2) the commuting distances and times, and (3) the location of businesses providing goods and services to the installation, its personnel, and their dependents. Accordingly, CERL chose Shelby County as the ROI because the county received the majority of installation procurement and contractual spending and provided a majority of the necessary goods and services for the installation, including housing, public services, and transportation. Specifically, 93 percent of former DDMT employees resided in Shelby County.

Since the detrimental impacts of the DDMT closure will likely be distributed throughout a region smaller than the Memphis MSA, CERL finds that this component of the analytical process has, in part, caused a potential understatement of the cumulative closure impacts. More specifically, since use of the Memphis MSA as the ROI inappropriately dilutes the likely economic impacts over too broad a region, the likely impacts of the closure on the actual ROI have likely been understated. However, the relative significance of this particular assumption cannot be evaluated independently, as it is only one component that will ultimately contribute to the cumulative net closure impact estimate.

Effects of Job Placement Efforts

A second reason that the economic impacts are likely to have been miscalculated relates to the lack of consideration given to net positive impacts of job replacement efforts in the impacted region. While it is true that lost employment detrimentally affects a local economy, it is also true that such effects can be largely mitigated if laid-off persons are able to find similar new employment in

* The five-county Memphis MSA generally includes the counties of Shelby, Fayette, and Tipton in Tennessee; Crittenden County, AR; and Despot County, MS.

† Refer to the FEA for BRAC 95 Disposal and Reuse of the Defense Distribution Depot Memphis, Tennessee, pp 4-51.

the same region.* CERL sources indicate that at least some of the former DDMT employees have found alternative employment or been realigned locally. The EDC Application apparently overlooks the significance of this fact and bases its impact analysis on the assumption that every former DDMT employee will either leave the area or be unable to find a new job, in effect calculating the theoretical "worst-case" scenario for economic impact, rather than the likely actual impact.

According to DDMT sources,[†] at least some of the former civilian and military personnel are known to have accepted jobs or taken transfers locally. Although the exact number remains unknown, CERL is comfortable using a conservative estimate of 10 percent to capture the effects of this dynamic. The EDC Application does not address these efforts, nor do the calculations presented evince the inclusion of job placement effects. For these reasons, CERL finds it highly likely that the total impact estimates in the EDC Application are misstated.

Regional Employment Trends

A relevant factor to be considered in conjunction with the apparent success of DDMT job placement efforts is regional employment trends. These trends are perhaps most indicative of the local economy's capacity to withstand and recover from likely closure impacts. If an economy is experiencing record low unemployment, its capacity to absorb displaced labor is much greater than an economy facing high unemployment levels, which are often indicative of economic hardship. For this reason, considering important economic indicators such as unemployment is necessary to assess closure impacts, as they often demonstrate dynamic realities not captured by even the most sophisticated analytical models.

The job market in Memphis is booming, as exhibited by steady growth and decreasing unemployment since 1991. Specifically, throughout this time period, the average annual increase in jobs has been 2.2 percent, with the highest increase of 5.5 percent occurring in 1995, the year of the BRAC decision.[‡] More importantly, from 1995 to 1997, during which DDMT was rapidly downsizing in preparation for its scheduled 1997 closure, these unemployment trends

* Note that this assumes the new position to be substantially similar in type and compensation to the old position.

† These facts were obtained from Pam Gaudy, Memphis Depot Caretaker, DDMT.

‡ Source: U.S. Department of Labor, Bureau of Labor Statistics.

continued, as shown by near-record low unemployment rates that were below both the state and national averages.

Given such striking trends, the Memphis economy clearly exhibits a strong demand for labor. As a result, CERL has determined that the Memphis economy appears to demonstrate the capacity to rapidly absorb displaced workers. Moreover, while this characteristic may ultimately mitigate likely closure impacts to a large extent, it will prove to be a factor worthy of consideration in projecting job creation estimates that result from future redevelopment opportunities.*

Adverse Economic Impact of the Closure of DDMT

After developing independent estimates of the closure impacts for DDMT, CERL was unable to confirm the estimates presented in the EDC Application. Although the EDC Application correctly identifies DDMT as a large employer in the Memphis Metropolitan Region, CERL finds that, despite any understatement incurred from the LRA's definition of an overly broad ROI, the actual closure impacts are likely to be substantially lower than the estimates presented in the EDC Application.

Assumptions

CERL's independent impact estimates relied on the following assumptions:

- Approximately 19 percent of employee's salaries and wages are paid to Federal and state governments in the form of taxes†
- The consumption patterns of civilian employees and contractors are similar to the consumption patterns of other middle-class residents in the determined ROI
- Spousal employment patterns for DDMT employees are similar to spousal employment patterns in the determined ROI

* Refer to Chapter 2, **Extent of Long-Term Job Creation**, for further discussion of job creation impacts.

† 19 percent is an approximate figure because some forms of taxation are difficult to measure directly. For example, vehicle licensing fees, service fees, or other similar municipal fees are economically similar to taxes, but can be difficult to capture using an input-output approach.

- "Employee compensation" includes all salaries and wages, as well as life and health insurance, pension payments, and any other non-cash compensation.

Findings

CERL's independent analysis indicates that the *total* direct and indirect impacts associated with the closure of DDMT will generally be anywhere from 50 to 75 percent larger than the *direct* losses associated with the base closure itself. More specifically, CERL found that, for each dollar spent directly on base activities, the surrounding communities will lose about \$1.75 in total output, and for each job lost at DDMT, the area will lose a total of about 1.48 jobs. CERL's findings are consistent with similar findings presented in studies of short-term base closure impacts.* Note that short-term impacts will generally be the most obvious and pronounced, as the local economy stabilizes and clears excess capacity and resources.

CERL's independent analysis also indicated that at least some of the former civilian employees and contractors at DDMT will not leave the area to seek new employment, further limiting likely impacts on the area. CERL did not develop exact estimates of the number of people leaving, both because of the volume of available data and the lack of consistency within it; however, CERL felt comfortable in using a rather conservative estimate of 10 percent to capture the effects of this dynamic.

Finally, in contrast to the EDC Application, which cited 1991 budget data as a reference for comparison in the determination of economic impact estimates, CERL's independent analysis was based on expenditure data for fiscal year 1995 (FY95). CERL determined that 1991 data do not provide a realistic basis of comparison to assess the impact of closure for two primary reasons. Foremost, as a matter of policy, CERL typically calculates all economic impacts from the date of the closure announcement. Compromises to this policy are made only in situations when the EDC Application demonstrates a compelling, well-supported argument evidencing significant impacts sustained prior to the closure announcement. The DDMT EDC Application does not provide such an argument. In addition, use of 1991 data as a baseline for normal operating levels is inappropriate given that the United States was engaged in Operations

* See, e.g., National Defense Research Institute, "The Effects of Military Base Closures on Local Communities: a Short-term Perspective," Rand Institute.

Desert Shield and Desert Storm at that time. Consequently, given the increased level of operations associated with the conflict, CERL does not feel 1991 provides an accurate baseline for comparative purposes.

When looking at past budget data for DDMT from the year of the closure announcement (1995) to the year of the actual closure (1997), it is apparent that pre-closure impacts were sustained during this time period in anticipation of the closure. Specifically, throughout this time period (1995 to 1997), DDMT's workforce dropped from roughly 1,300 to roughly 850 (35 percent), and total non-BRAC expenditures (salary and nonsalary) decreased from about \$70.6 million to about \$55.6, accounting for slightly more than a 22 percent reduction in spending. CERL considered this evidence and determined that DDMT budget data for FY95 provided an appropriate measure of DDMT's mean contribution to the local economy. Accordingly, CERL used expenditure data for FY95 in conducting its independent analysis of likely closure impacts. Table 1.1 shows CERL's findings in more absolute terms.*

Since CERL was able to obtain only gross figures that did not delineate specific budget expenditures, the above lost output and lost income figures do not fully reflect possible mitigation measures that may have been undertaken since the closure was announced. In addition, since only a conservative estimate of relocations were subtracted out of the aggregate employment data, and given the region's low unemployment and subsequent likely capacity to rapidly absorb displaced workers, CERL is confident that its calculated economic impact estimates reflect a compromise and relate acceptable orders of impact magnitude.

Table 1.1. Adverse economic impact of DDMT closure.

Type of Impact	CERL Estimates		MDRA Estimates	
	Gross Output (\$)	Employment (Jobs)	FY91 Gross Output (\$)	Employment (Jobs)
Direct	41,203,913	1,190	50,000,000	1,300
Indirect and Induced	28,227,431	726	45,000,000	2,049
Total Impacts	69,431,344	1,916	95,000,000	3,349

* Estimates of 1995 salary, nonsalary, and employment data at DDMT used in programming the Implan model were obtained from Pam Gowdy, a DDMT caretaker assigned to assist CERL in its data call procedure.

Potential for Economic Recovery

CERL's independent analysis indicates that, although the total closure impacts may be fairly significant, a strong potential exists for a full recovery in the region. Given that a 440,000 SF manufacturing firm has already located on site, reuse potential is already evident. Job creation is discussed in more detail in Chapter 2, **Extent of Long-Term Job Creation**. Nevertheless, a full recovery appears likely even with very conservative job-creation estimates.

Conclusion

The impact analysis presented in the EDC Application suffers from a series of theoretical and practical limitations that overstate the socioeconomic impacts. The first weakness in the application methodology relates to the choice of an overly broad ROI. In addition, the economic impacts are likely to have been overstated given the job replacement efforts in the determined ROI, as well as the region's low unemployment and subsequent capacity to rapidly absorb displaced workers.

Specifically, the LRA estimated that total detrimental impacts are expected to be on the order of 3,349 direct and indirect jobs, accounting for \$95 million in total output. By contrast, CERL determined that impacts would likely amount to 1,916 direct and indirect jobs, or \$69.5 million in gross output. In any case, even under the most conservative assumptions, a full economic recovery from the closure of DDMT will be likely, particularly given the relative insignificance of the closure on the regional economy.

2 Extent of Long-Term Job Creation

Prepared by:

Shawn R. Hill, Community Planner

Jonathan D. Trucano, Community Planner

CERL, ATTN: CN-B

P. O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511

Overview

The EDC Application for DDMT is required by Federal law to discuss job creation prospects for the proposed reuse of the DDMT facility. One of the principal eligibility criteria that the military must consider when reviewing an EDC Application is the extent of job generation. Job creation, after all, is the primary intent of this "jobs centered" property disposal authority.

Background and Approach

Although the MDRA did provide both 5- and 15-yr job creation estimates, the application failed to present a persuasive case in support of its job creation projections. More specifically, because the MDRA did not clearly delineate either the manner in which calculations were made, or the underlying assumptions necessary to support these calculations, CERL's analysis was not limited to its typical independent validation of the calculation methodology and source data. Consequently, CERL deemed it necessary to conduct an independent analysis, and its scope of review in this case was considerably less deferential than has been the case for other, more complete EDC applications.

Although the forecasting procedures used by CERL will generate sound estimates, it is important to note that the resulting projections are only as useful as the validity of the underlying assumptions. Major changes in key assumptions, especially changes in the absorption schedules for existing and new gross square footage, in the aggregate economic activities of the tenants, or a downturn in the

Memphis economy, may lead to dramatic differences between the number of jobs actually created and these projections.*

Process Methodology

Following the standard procedure for applying an input-output analysis, CERL attempted to estimate the anticipated level of long-term economic activities generated as a consequence of the proposed DDMT reuse. By comparing these activities, and their associated volume, to similar activities already occurring in the local economy, CERL is able to construct a series of multipliers that describes the likely impact that any new (but similar) business activities will potentially have on the local area. Since the elements of a regional economy are inherently interrelated, this approach offers an effective way of measuring the cumulative impact of a given event. More specifically, consider that each permanent DDMT end user will ultimately create a particular set of onsite jobs at the former DDMT site. However, since these employees will inevitably purchase goods and services in the surrounding community, the creation of onsite jobs (direct effect) will result in the creation of additional offsite jobs (indirect/induced effect) within the surrounding economic area. Consequently, when deriving its job creation estimates, CERL applies an employment multiplier in attempting to capture the impacts associated with both direct and indirect effects. Once these effects are calculated for each activity, they can be grouped together to find total employment impacts.

Extent of Long-term Job Creation

Although it is impossible to definitively project job creation that may occur over a 15-yr period, CERL's analysis generally confirmed the job creation estimates presented in the EDC Application. In addition, CERL used Implan Pro 1.1 to calculate employment multipliers in attempting to forecast indirect and induced jobs that will potentially be created by the redevelopment of DDMT.

* Refer to Chapter 4, **Business Plan Review and Market and Financial Feasibility Analysis**, for more detail on these schedules.

Methodology

Specifically, CERL generated long-term job creation estimates by implementing a three-step process. This process consists of: (1) considering the types of activities that are likely to take place during and after full redevelopment, (2) developing appropriate multipliers to capture the local impact of these activities, and (3) projecting likely cumulative total impacts. Although the MDRA clearly identifies the types of land uses that will ultimately occupy the site, the exact type of end user will not be determined until occupancy occurs. Therefore, the calculation of these estimates is constrained by the absence of exact information regarding the volume of economic activity these tenants are likely to generate. In addition, although both the MDRA and CERL were able to generate similar direct employment estimates, these estimates varied somewhat. This variance was most likely attributable to differing assumptions regarding the employment densities of tenants likely to locate at the site. Hence, the inaccuracies inherent in this approach will likely result in final estimates that are less accurate than estimates derived from actual gross revenue data.

Multiplier Calculation

CERL extrapolated potential employment densities from typical industry standards present in the Memphis Metropolitan Region. This factor is important in estimating gross economic activity because employment projections are a function of both how fast the local market absorbs new space, as well as how intensively the new space is used.

One weakness in the EDC Application was a failure to provide the employment density ratios used in deriving the impact estimates presented. Therefore, CERL was unable to evaluate the appropriateness of these estimates by comparing them to industry norms for the area. In conducting its independent analysis, CERL based its calculations on conservative adaptations of typical employment densities as per the Urban Land Institute (ULI) Business and Industrial Park Handbook. The densities used by CERL are listed in Table 2.1.

Table 2.1. Long-term direct and indirect DDMT EDC employment projections.

Land Use Type	Developed SF	CERL Employment Density Ratio	Onsite Jobs Created	Employment Multiplier	Total EDC Jobs Created
Manufacturing	2,340,000	1,000	2,340	2.469	5,777
Warehouse/Dist	1,359,316	1,500	906	2.267	2,054
Future Development	2,178,000	1,250	1,452	2.368	3,438
Total	5,907,391	NA	4,698	NA	11,269

While the MDRA did provide adequate information regarding the types of end users that will potentially occupy the redeveloped site, the EDC Application failed to provide typical multiplier estimates associated with these land uses. Accordingly, CERL found it necessary to make some general assumptions about the future tenants with respect to these issues. More specifically, the primary focus of the MDRA's Preferred Reuse Scenario centers on the redevelopment of light industrial manufacturing and distribution space. Accordingly, CERL's analysis assumes that the activities of the future light industrial tenants will directly correspond to the contributions of the existing light industrial firms operating within the local area. Making this assumption allowed CERL to aggregate the employment multipliers associated with these similar industries, essentially constructing a gross multiplier that is generally indicative of the contributions made by existing local firms. After constructing these aggregations, CERL found that typical employment multipliers for local light industrial warehouse and distribution activities are probably about 2.2; similarly, employment multipliers for light industrial manufacturing uses were found to be about 2.5.

Long-term Employment Projections

After developing an idea of the economic volume that will take place after redevelopment, as well as the types of activities it will probably involve, CERL developed two individual forecasts for likely long-term job creation. The first scenario focuses solely on the leaseable square footage created from the redevelopment of existing facilities in its job creation estimates, while the second scenario takes into account land in the western portion of the site slated for future sale and development. Table 2.1 summarizes the long-term employment projections calculated as part of CERL's independent analysis. Land use attributed to manufacturing and warehousing/distribution is representative of the primary scenario, while the square footage total attributed to future development is a calculation of potential industrial space — and thus, jobs — that may arise from the development of parcels slated to be sold.

Table 2.2 compares the various CERL scenarios with the figures presented by the MDRA in its EDC Application. The figures derived by CERL vary from estimates cited in the EDC Application for several reasons. Foremost, the EDC Application failed to identify the underlying assumptions and corresponding calculations used to derive its estimates. It is unclear in both the MDRA's Reuse Plan and EDC Application as to whether the estimate of onsite employment includes any provision for land sales in the western portion of the site. Because the absorption schedules presented by MDRA do not include square footage attributed to this land, CERL assumed that land sales did not factor into the

MDRA's job generation estimates. Hence, although a similar estimate of direct, onsite jobs was obtained, CERL was unable to confirm either the validity or the appropriateness of the analytical methodology and underlying assumptions used by the MDRA in deriving its estimates. In addition, the MDRA's apparent failure to use employment multipliers resulted only in the calculation of direct estimates, which do not capture important residual effects. In particular, estimates provided in the EDC Application predict that roughly 4,572 jobs will ultimately be created from the redevelopment of the EDC parcel. This figure is comparable to the direct "onsite jobs" estimate of 4,698 calculated by CERL. However, once multiplier effects are considered, CERL estimates that roughly 7,800 jobs could potentially result from the EDC parcel alone, and a total of more than 11,000 jobs could be created if the former DDMT site achieves full build-out.

Table 2.2. Comparison of CERL and MDRA job creation estimates.

CERL Estimates			MDRA Estimates	
	Direct	Total (Direct + Indirect)	Direct	Total (Direct + Indirect)
Low (Without Land Sales)	3,246	7,831	4,572	NA
High (With Land Sales)	4,698	11,269	NA	NA

Caveats

Since it was necessary to make a variety of assumptions to construct these estimates, several caveats are in order. Although CERL has attempted to present conservative estimates that minimize the possibility of overstating job creation estimates where possible, potential problems can always arise when economic forecasts are based on such a large assumption set. The caveats used by CERL in conducting its analysis are as follows:

- Analyses assume that the activities of future tenants will be functionally similar to those of similar firms in the local area.
- The modeling procedure used to construct these estimates (a standard input-output model) assumes that an underlying regional economy is static in nature, and cannot capture essential long-term structural changes. Thus, fundamental shifts in a local economy may render its projections inaccurate, especially with regard to indirect and induced projections.

- Although CERL was able to generate gross estimates based on various assumptions,* some inaccuracies are inherent in this approach that will likely result in a model that is less accurate than one based on actual gross revenue data.
- Major changes in the absorption schedules for existing and new gross square footage,† in the aggregate economic activities of the tenants, or a downturn in the economic cycle, may lead to dramatic differences between the number of jobs actually created and these projections.
- No attempts were made to adjust for inflationary effects, because the lack of future gross output data precluded CERL from developing an acceptable method of adjusting long-term estimates. Errors caused by this omission will likely be insignificant.
- Effects stemming from future development on vacant parcels (specifically employment density ratios and employment multipliers) were estimated as the average of manufacturing and distribution land uses.

Reconciliation of Job Creation Projections and Closure Impacts

As the final step of the analysis, CERL compared its employment generation forecasts to the economic impacts that would likely result from the closure of DDMT (see Chapter 1, **Adverse Economic Impact of the Closure on the Region and the Potential for Recovery After the EDC**). This final analytical step is intended to offer an idea of when total closure impacts might reasonably be mitigated. Thus, it is significant to note that the number of jobs that will potentially be created from the EDC after 4 years alone fully mitigates the impacts that are projected to result from the 1995 BRAC decision. Moreover, at full build-out, CERL's analysis indicates that a large, positive net gain in employment for the region will likely be realized.

* Examples would include the total number of people that future tenants at DPSC might employ and the type of tenants that will locate at DPSC.

† See Chapter 4, **Business Plan Review and Market and Financial Feasibility Analysis**, for more detail on these schedules.

Conclusion

CERL's analysis of potential long-term job creation suggested that about 4,700 direct and about 11,300 total jobs will eventually be created as a result of the DDMT EDC. CERL assumed that the MDRA's job creation estimate of 4,572 was presented as a direct onsite estimate. This supposition was necessary because the EDC Application failed to identify the underlying assumptions and corresponding calculations it used to derive its figure. In addition, CERL has estimated that the EDC will generate 2,008 direct onsite jobs within the first 5 years of the plan, an estimate slightly lower than the 3,038 estimate presented in the EDC Application. Finally, since the MDRA failed to present analytical support and qualitative justification for its estimates, CERL was unable to determine whether these estimates were generated in a methodologically sound manner.

Overall, the major discrepancy between the estimates made by MDRA and CERL probably resulted from a failure to consider indirect employment effects, which therefore resulted in an understatement of total job creation. Nevertheless, the total number of jobs that potentially will be created as a result of the proposed EDC will fully mitigate any adverse employment impacts generated from the 1995 BRAC decision.

3 EDC Application's Consistency With the Overall Redevelopment Plan

Prepared by:

Jonathan D. Trucano, Community Planner

CERL, ATTN: CN-B

P. O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511

Background

The objective of this chapter of the review is to determine whether the redevelopment implementation strategy proposed in the MDRA's EDC Application and Business Plan is consistent with the adopted Memphis Depot Redevelopment Plan. The Depot Redevelopment Corporation of Memphis and Shelby County approved the Redevelopment Plan in May 1997.

It must be noted that the adopted Memphis Depot Redevelopment Plan is inclusive of the entire DDMT site; in contrast, the EDC Application does not include those parcels slated for conveyance through other mechanisms, such as negotiated land sales and public benefit conveyances (PBCs). Of the 642-acre DDMT site, the EDC parcel constitutes only 495 acres.

Conclusions

After reviewing the MDRA's EDC Application and adopted Redevelopment Plan, CERL finds that the application, in conjunction with other planned PBCs, is generally consistent with the goals, objectives, and implementation strategies set forth in the Redevelopment Plan. The EDC Application, however, offers little in the way of specific details, and certain discrepancies exist in the application's figures when compared to those of the Redevelopment Plan. CERL used the following criteria when reviewing the EDC Application and Redevelopment Plan for consistency.

The application captures the spirit and intent of the Redevelopment Plan by meeting the following stated goals and objectives:

- The proposed reuse of the DDMT site will maximize community employment, wages, and capital investment through redevelopment of the Depot and the surrounding area commencing immediately.
 - Place highest priority on attracting new or expanding businesses to the Memphis market area.
 - Encourage new Depot businesses to hire Depot employees and local community residents.
- The proposed reuse of the DDMT site will improve the local quality of life by using Depot facilities to meet community needs and ensuring redevelopment is compatible with the surrounding areas.
- The proposed reuse of the DDMT site will generate cash flow early on through interim leases and other means to support maintenance, improvements, and marketing efforts.
- The proposed reuse of the DDMT site will maintain overall community public health as the number one priority in environmental remediation work.

The application is consistent with the Redevelopment Plan's marketing strategy and implementation plan as follows:

- The application places a strong emphasis on targeting light manufacturing and assembly firms as key components in the redevelopment of the EDC parcel. Warehousing and distribution also play a major role in the application, acknowledging the comparative advantages the Memphis region possesses in this sector.
- The application generally defers to the Redevelopment Plan in terms of implementation and marketing strategies, site design, phasing, and capital improvements programming. However, several discrepancies exist in the allocation of costs and revenues within the Business Plan, outlined in the following section.

Inconsistencies Between the Redevelopment Plan and the EDC Application

In the course of its technical review, CERL identified several unexplained discrepancies between the EDC Application and the Redevelopment Plan. Foremost was the inclusion of Phase 6 costs in the EDC's Business Plan. Phase 6 is clearly identified in the Redevelopment Plan (Section VI.31) as comprising solely the Dunn Field area, with redevelopment contingent upon environmental

remediation, and therefore outside the scope of the EDC. In spite of this, costs are attributed to this parcel for capital improvements, specifically for upgrades in water distribution, telecommunication, electrical, storm water, and natural gas systems, as well as for parking lots; a total of \$2.4 million in all.

Additionally, the Redevelopment Plan and the EDC Application contain differing job creation estimates. Since no additional information is given in the EDC Application regarding sources of this data, the exact reason for this discrepancy is unclear. To further complicate matters, no estimates of indirect job generation potential are identified, either in the Redevelopment Plan or EDC Application, which makes comparisons with CERL figures all the more problematic.

4 Business Plan Review and Market and Financial Feasibility Analysis

Prepared By:

J. Michael Rubenacker, Realty Specialist

ICF Kaiser, Inc. (CERL contractor)

P.O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511, x6383

Objective

The objective of this chapter is to provide a review and analysis of the financial feasibility of the DDMT EDC Application and its business and operations plan. CERL's technical review of financial feasibility includes market analysis and the need and extent of proposed infrastructure investment (see Chapter 5). Elements of importance in the review of the business plan include (DoD 1997):

- a property development timetable, phasing plan, and cash flow analysis
- a market and financial feasibility analysis describing the economic viability of the project including:
 - an estimate of net proceeds over the projected development period
 - the proposed consideration and payment schedule to the Defense Logistics Agency (DLA)
 - the estimated FMV
- a cost estimate and justification for infrastructure and other investments needed for the development of the EDC parcel (Chapter 5, **Need and Extent of Proposed Infrastructure Improvements**)
- local investment and proposed financing strategies for the development (also covered in Chapter 6, **Extent of State and Local Investment and Risk**).

Background

The MDRA is requesting an EDC to acquire approximately 495 acres of the 642-acre Depot for a proposed consideration to the Department of the Army of \$0 (Memphis EDC Application, 1998). The EDC parcel contains approximately 130 existing buildings, of which 84 are considered significant in terms of size, representing over 6.4 million SF of total floor space. Over 260,000 SF of building inventory has been claimed by McKinney Act homeless providers and various state and local government agencies under PBCs. Of the 6.2 million SF of existing building space contained within the EDC parcel, roughly 2.6 million SF has been programmed for demolition by the applicant.

According to the May 1997 Reuse Plan, the strategic goals of MDRA are as follows:

- to maximize community employment, wages and capital investment through redevelopment of the Depot and the surrounding area
- to improve the local quality of life through utilizing Depot facilities to meet community needs and ensure redevelopment is compatible with the surrounding areas
- to generate cash flow early on through interim leases and other means to support maintenance, improvements, and marketing efforts
- to maintain overall community public health as the number one priority in environmental remediation work (Memphis Reuse Plan, 1997, p II.2).

To accomplish these goals, the primary focus of the Reuse Plan is to transition DDMT into a modern, marketable, light industrial park with distribution/service (51 percent) and light manufacturing (49 percent) through the reuse of DDMT warehouse buildings. The preferred reuse scenario also develops 161 acres in parcel sizes from 4 to 15 acres for future light industrial development. The redevelopment schedule is programmed over six phases, dependent on environmental, marketing, and capital improvement programs. Table 4.1 summarizes the MDRA's land-use mix and existing building space for each district.

Table 4.1. Proposed EDC land uses and existing acreage and building space.

Proposed Land Use	Updated EDC Request	
	Acres	Existing SF
Distribution/Service	103.5	1,850,485
Light Manufacturing	11	1,759,904
Future Development	161	
Open Space/ROW	119.5	
Total	495	3,610,389

It is worth noting that the MDRA did not request 147 acres of the 642 acres at DDMT in the EDC Application. As Table 4.1 suggests, only 495 acres are actually contained in the EDC parcel. This difference is due to the several PBCs, which will likely be approved, and will result in reduced acreage and building inventory. These PBCs contained in the EDC Application include the following real property deductions:

- Golf Course – 6,771 SF of building space
- Homeless Provider Request – 22,028 SF
- Police Compound – 59,751 SF
- Education and Training – 174,770 SF (Buildings 144, 274, and 925).

Approach

The approach to the technical review included a review of the entire EDC Application package and supporting documents and reports. CERL also conducted interviews with the DDMT Caretaker Force personnel; USACE Memphis District action officers who are currently handing the real estate disposal of DDMT; local industrial, commercial, and residential real estate brokers; and local economic development officials (CERL site visit to DDMT 18-20 May 1998). With necessary site data collection complete, CERL was then able to perform market and financial feasibility analysis through the development of spreadsheet-based models, pro formas, and tables. In general, the enclosed spreadsheets are organized in two principle groups: (1) a recast of the EDA business plan assumptions and discounted cash flow results and (2) CERL-developed data tables, analyses, and findings of financial feasibility. After a general discussion of these two sets of analyses, CERL will present its findings.

Recast of MDRA Business and Operations Plan

To aid in the analysis and documentation of the financial feasibility of the MDRA business and operations plan, CERL recast the applicant's assumptions into computer spreadsheet-based pro formas, models, and tables. This recast accomplished two objectives: (1) to check the applicant's mathematical calculations, methodology, and proper application of discounted cash flow methodology, and (2) to give CERL analysts an opportunity to fully understand the assumptions that support the applicant's cost and revenue projections. Once reconciled and understood, this recast serves as a baseline model for developing and testing alternative business plan scenarios.

In this case, the MDRA EDC business and operations plan and supporting narrative in the application do support the projected real estate revenues, operating costs, and debt service. However, the applicant's discounted cash flow methodology fails to properly present the valuation of the business and operation plan due to the improper consideration of the plan's residual value and the incorrect treatment of the outstanding debt at the end of the plan. These shortcomings were to have a significant effect on the valuation of the plan and will be discussed in detail later in the review.

In the course of the EDC review, CERL also encountered several instances where the assumptions presented in the business and operations plan were not correctly applied. This resulted in differences between the recast values obtained by CERL and those presented in the MDRA's plan. Nevertheless, because CERL was able to correct the deficiencies in the MDRA's plan, the recast more closely represents the assumptions presented by the MDRA and CERL does not feel that the differences are materially significant to the analysis of the plan. A listing and description of the tables supporting the MDRA business plan recast follow:

Tables B.1 through B.6 in Appendix B relate the baseline set of assumptions used by CERL to evaluate the financial feasibility of the MDRA business plan. A description of each of these tables follows. As noted above, however, CERL was unable to independently recast the MDRA's business and operations plan accurately because of the observed use of inconsistent or poorly defined assumptions in the MDRA plan. These findings will be discussed in further detail in the **Business Plan Review and Findings** section.

Table B.1, Building and Land Inventory, provides a database of EDC buildings by land use, the MDRA's proposed reuse for the building, and attendant square footage.

Table B.2, Summary of Absorption and Revenue Schedule, is presented in the form of a rent roll for the 15-yr period of the business and operations plan. This form allowed CERL to incorporate the various assumptions related to building lease terms, rent acceleration, and vacancy rates. The table contains 15-yr real estate absorption and revenue projections for leasable building space.

Table B.3, Summary of Capital Improvements, details the MDRA's estimated infrastructure costs by phase. These summaries provide comparisons between the capital expenditures costs as proposed by the MDRA and those costs as determined by CERL engineers (see Chapter 5, **Need and Extent of Proposed Infrastructure Improvements**, Table 5.1). Also, presented is an analysis of

the need and extent of capital expenditures as determined necessary by the CERL engineers to accomplish essentially the same level of development as the MDRA, but in a more cost-effective manner (Table 5.1).

Table B.4, Debt Service, was partially based on bond issue projections made by the MDRA in the business and operations plan and independent assumptions developed by CERL. The table summarizes projected bond issues and attendant debt service over the 15-yr pro forma.

Table B.5, MDRA Business Plan Pro Forma Summary, projects 15-yr revenues, operating expenses, net operating income (NOI), infrastructure costs, cash flow, and bond issues. It also provides project net present value (NPV) calculations at 18 and 15 percent discount rates.

With these baseline analyses, CERL developed an alternative scenario to test the sensitivity of key assumptions and demonstrate the impact on the discounted NPV of the cash flows after making defensible changes to assumptions.

CERL Scenario Development

CERL developed the alternative scenario to test the sensitivity of certain key assumptions proposed in the MDRA business plan. CERL also challenged several assumptions based on review findings and documented the impact of these changes to project cash flows and the NPV of the business plan. The tables that document these findings are briefly discussed in this section. However, the analysis and findings that lead to the development of the alternative scenario are discussed in detail in the **Business Plan Review and Findings** section. The scenarios described below use constant dollar cash flow projections for costs and revenues, respectively. CERL used discount rates of 16 and 13 percent in calculating the NPV of its alternative scenarios. These discount rates were different than the 18 and 15 percent rates used by the MDRA, but are roughly equivalent to the MDRA's cost of capital of 7 percent plus redevelopment risk premiums of 9 and 6 percent, respectively.*

Table B.6, CERL1 Business Plan Pro Forma Summary, projects 15-yr revenues, operating expenses, NOI, infrastructure costs, cash flow, and bond issues in

* Assumes 1998 constant dollars. In other words, inflation considerations have been excluded from the analysis.

addition to NPV calculations at 16 and 13 percent under CERL1 Scenario assumptions.

Table B.7, CERL2 Business Plan Pro Forma Summary, projects 15-yr revenues, operating expenses, NOI, infrastructure costs, cash flow, and bond issues in addition to NPV calculations at 16 and 13 percent under CERL2 Scenario assumptions.

Table B.8, Scenario and Sensitivity Analysis, summarizes the impacts to revenues, operating costs, NOI, infrastructure costs, total cash flows, and bond issues. It also lists Year 15 property reversion calculations and NPVs at 16 and 13 percent discount rates. The table also provides three projects views, which are applied to NPVs: (1) MDRA recast cash flow with CERL-developed reversion, (2) CERL-developed infrastructure costs and reversion, and (3) CERL-developed infrastructure costs, reversion, and land absorption assumption.

Business Plan Review and Findings

Introduction

According to the MDRA, the proposed EDC and supporting business plan are consistent with the dictates of the Memphis Depot Redevelopment Plan that was completed in May 1997. Specifically, the Redevelopment Plan identified a range of redevelopment alternatives for the EDC parcel including light manufacturing and assembly, distribution/service, and future light industrial uses. More importantly, from a project implementation standpoint, the proposed EDC allows the City of Memphis and Shelby County to gain ownership and control of the site to "meet the goals which were adopted by the Memphis Depot Redevelopment Agency on behalf of the City of Memphis and Shelby County as part of the approved Depot Redevelopment Plan" (MDRA EDC Application, Section 5).

The MDRA further asserts that a \$42.6 million infrastructure investment is required to bring buildings within compliance of modern codes, improve access and roadways, create needed sewer and water capacity, and develop land parcels to accommodate future industrial development, allowing for the development of quality business park sites. The applicant, as developed through financial pro forma analysis, makes no conclusions as to the financial feasibility of the Business Plan. Instead, the MDRA presents a scenario which, despite several years of negative cash flows, generates an NPV of annual cash flows of positive \$3.2 million. Then, in a manner inconsistent with standard methodology, it reduces the NPV by the debt of \$22.9 million remaining at the end of Year 15

without the appropriate discounting of its value. The result is a real estate value less residual debt of negative \$19.7 million. In further discussion in the EDC Application, the MDRA presents the NPV of the NOI of the business plan discounted at 15 percent as \$16.1 million. They again adjust this value by the remaining debt at Year 15, \$22.9 million, with the result presented as the most optimistic valuation of *negative* \$6.8 million. However, after the presentation of the analysis, no offer is apparently made to the Army for the transfer of the properties requested in the EDC, nor is a zero-cost or 100 percent discount transfer requested. The following section is dedicated to the review and analysis of the MDRA's business plan, which is the instrument through which financial feasibility and potential monetary consideration to the Army is developed.

Description of Intended Uses (MDRA EDC Application, Section II)

An important first step in developing the Reuse and Business Plan is to inventory DDMT land and existing facilities that could be offered to the private sector for reuse and redevelopment. The intended purpose of this analysis was to develop a reasonable estimate of total land area that could potentially be marketed for sale, the number of marketable permanent-use buildings on the site, the amount of acreage that would be needed to support these uses, and the remaining acreage that is being transferred through PBCs or will remain under ownership of the Federal Government.

Land.

The Reuse Plan for DDMT identifies a range of intended uses for the surplus parcel, including light manufacturing and assembly, distribution/service, and future light industrial. CERL's reconciliation of the MDRA's intended uses and eligible EDC acreage resulted in the following land-use mix: 119.5 acres for open space/ROW; 161 acres for future industrial development; 103.5 acres for distribution/service; and 111 acres for light manufacturing and assembly (Table 4.1). The future industrial development has been subdivided into 25 parcels ranging from 4 to 15 acres primarily on the west end of the Depot for future industrial development.* The overall land-use composition results in a total of 495 acres relative to the total 642-acre total land within DDMT. As discussed earlier in this report, the balance of the acreage — some 89.5 acres — was requested for PBCs, including a 4-acre parcel committed to The Memphis

* Note that one parcel for future development is located at the northeast end of DDMT. See Figure 3, which contains the MDRA's proposed parcelization and site plan.

Metropolitan Inter-Faith Association (a local homeless service agency) under the approved Homeless Assistance Plan. Also included in this total are 6.5 acres requested by the Memphis Police Department; an estimated 50 acres requested by the Memphis Park Commission; and some 33 acres requested by the State Technical Institute of Memphis. The 64-acre Dunn Field has not been requested as part of the EDC.

Buildings.

The primary purpose of any Depot activity is typically the assembly, storage, and distribution of military goods and supplies. DDMT is no exception. Warehouse buildings account for most of its 3.6 million SF of site inventory (Table 4.1). Warehouses in the industrial area vary in size from 46,000 to 216,000 SF (Appendix B, Table B.1). Generally, the buildings that offer the most reuse and revenue-generating potential are the larger, newer warehouse buildings. All the buildings in the reuse scenario are of concrete construction, either masonry, cast-in-place, or tilt-up walls, except for Building 835, which is a pre-engineered metal building. The largest category is the cast-in-place concrete warehouses known as the "Typical Twenty" that average approximately 110,000 SF and total over 1.7 million SF. Next are the "Typical Six" warehouses and addition that are each approximately 207,000 SF (except for Building 689, which is over 216,000 SF, and the addition, which is approximately 46,000 SF). The Typical Six warehouses total 1.3 million SF. Miscellaneous buildings with significant square footage include Buildings 360 and 560 at 207,000 SF each and Building 835 with 141,000 SF. Some warehouses have been identified as having specialized equipment and operations that include conveyor systems, storage racks, and hazardous materials storage capacity. Finally, most of the warehouses at DDMT have both rail and truck access, although the reuse plan calls for the removal of the rail service. Most of the facilities contain heated bays, and Building 560 is air-conditioned.

In terms of revenue-generating uses of existing buildings that are not programmed for immediate demolition, none of the space is projected to be leased because of functional and economic obsolescence and the cost to improve the space even for an interim lease period. The MDRA has designated nearly 3.6 million SF exclusively for leasing, with the eventual sale of leased facilities to investors in Year 15 of the Business Plan. Tenants seeking low-cost space for manufacturing and assembly and distribution/service are anticipated to be most, if not all, of the leasing activity of existing buildings.

Market Analysis

Demand.

Once a development strategy has been formulated based on a bottoms-up assessment of existing facilities, a market analysis is performed to estimate the potential marketability of land and buildings based on real estate market demand and supply drivers. In this case, income projections for light manufacturing/assembly and distribution/service are based upon market research conducted by The Pathfinders.* The market findings developed by The Pathfinders serve as the basis for developing annual property absorption and revenue projections from the leasing of existing buildings. They attempt to answer the fundamental question of whether Memphis has the attributes that make it and DDMT marketable to business and industry as a potential location from which to operate. The Pathfinders' answer to that question is a definite "yes."

An exceptionally strong regional real estate market that is benefiting from low inflation and interest rates should drive demand for DDMT land and facilities. Memphis itself is the 18th largest city in the nation with a population of over 1 million persons in the MSA. Traditionally an agricultural economy, Memphis now promotes itself as the country's distribution hub. Major investments in distribution-related infrastructure and the establishment of a Foreign Trade Zone have allowed Memphis to compete for and attract some of the world's largest distribution and transportation companies.

That most of the space available within DDMT is readily usable for distribution/service-based operations should make it attractive to end users looking for economical, well-located second generation space. Add the healthy sales and leasing activity, positive absorption, and low vacancy rates currently being experienced in the Memphis market, and one has a situation conducive to the successful redevelopment of DDMT.

Memphis has also enjoyed steady growth in its job market since 1991. The annual average increase in jobs has been 2.2 percent, with 1995 being the highest at 5.5 percent. Since 1994 all labor market sectors have increased the number of jobs except for manufacturing, which lost 2 percent (from 65,300 to

* The Pathfinders are the consultants for The MDRA who produced the Memphis Depot Redevelopment Plan and EDC Application.

64,000). The robustness of the Memphis economy is also reflected in an unemployment rate that has been lower than the aggregate for the State of Tennessee and the U.S. economy as a whole. In actuality, the number of new jobs expected to be created by the redevelopment of DDMT may tax a workforce that, in the judgement of the Pathfinders, is a weakness of the Memphis economy. This weakness is not so much because of a lack of skills, but rather because of the perceived poor work ethic characteristics of the workforce. In its EDC Application, the MDRA projects the creation of 3,038 new jobs within the first 5 years and 4,572 new jobs over the 15-yr redevelopment.

Industrial.

Information on the Memphis industrial market was gathered by The Pathfinders for 1993-1996. Per their study, which was based on numbers provided by the Memphis Chamber of Commerce, the Memphis industrial market showed strength in all areas. Over this time period, the total market size increased from 36.1 million SF to 123.6 million SF, an increase of 342 percent. In terms of new construction and available square feet, the increases were just as dramatic. New construction increased from 0.4 million SF in 1993 to a high level of over 3.6 million SF in 1995 and approximately 3.5 million SF in 1996. During this period, the vacancy rate fell from a high of 18.12 percent in 1993 to 8.77 percent in 1996, reflecting a very strong net absorption of space. Also, average rental rates remained relatively steady during this period, remaining in the \$3/SF range.

The Pathfinders assume that the existing local demand will be the dominant factor in the lease rates for the DDMT facilities. They quote the "Market Update" prepared by the Society of Industrial and Office Realtors for 1995 to support their view.

The city of Memphis once again experienced growth in 1995. There were some 15,000 new jobs created for the Memphis metropolitan area which represented a 3% increase in non-agricultural employment over 1994. The growth equaled 104 companies which opened new facilities and 87 existing companies which expanded. Nearly 200 new and expanding companies resulted in over \$325 million in capital investment. Even though unemployment is under 4.5%, Memphis continues to be a major force as companies review locations for projects. The Memphis industrial market continues to experience record levels of absorption, particularly in the leasing of bulk distribution space. Also, more than 4.5 million square feet of space was absorbed in 1995. There has been a steady stream of new national companies and telecommunication operations in Memphis. There was much new speculative development completed during 1995, as there was vacant space at the beginning of the year. While bulk users of space makeup the majority of users in the industrial market, significant

office space, technical repair operations, and telecommunication centers were included in the 1995 absorption rates. Levels of positive absorption will continue in the industrial markets as companies across the country consider consolidation of their distribution operations.

To fully develop the recommended lease rates for DDMT, The Pathfinders surveyed developers and realtors in the local market. They found the results to be "surprisingly uniform" and recommended the following rates on a NNN basis. The Typical Twenty buildings should be priced at \$1.50/SF, the Typical Six should be priced at \$2.00/SF, Buildings 360 and 560 should be priced at \$3.00/SF, and Building 835 should be priced at \$3.50/SF. Presented as an assumption in the business plan is an annual average absorption of 226,000 SF, which The Pathfinders call modest. The EDC Application uses an assumption of 213,000 SF as the annual average absorption. In neither instance is there discussion of how these numbers were arrived at nor is any supplementary data provided to further support their numbers. Also, it should be noted that nowhere in the Reuse Plan or EDC Application is the issue of the market value for industrial land sales addressed as it might relate to the land parcels being developed in the west end of the Depot. Although there is an assumption that no building or land sales will be made during the period of the business plan, an investigation of the potential value should have been an integral part of the analysis, as significant resources are to be expended for the improvement of these west end land parcels. This expenditure would only seem reasonable if an identifiable market existed for land parcels of the nature and size proposed at values able to support such an expenditure. A final assumption made in the Reuse Plan and EDC Application is that the distribution of leased space will be 51 percent distribution/service and 49 percent light manufacturing/assembly. Again, no apparent discussion or market data to support the basis for this distribution was provided.

CERL findings for industrial demand.

CERL was able to supplement the information presented in the reuse plan with information collected from real estate research firms, government studies conducted in conjunction with BRAC initiatives, interviews with local real estate brokers, as well as other referenced sources (Chapter 7, **Local and Regional Real Estate Market Conditions**). CERL obtained industrial market information from Wilkinson & Snowden Year End Industrial Market Overviews for 1995 through 1997. This data is more current than the information presented in the reuse plan as it shows 1997 to be an equally strong year for market growth in the Memphis industrial market. There are some differences in the 1995 and 1996 data between the Chamber of Commerce data presented in the reuse plan and the Wilkinson & Snowden data. While the total market size is higher in the

reuse plan, new construction, net absorption, and occupancy rates are significantly higher per Wilkinson & Snowden.

In terms of absorption findings, the MDRA's industrial space absorption assumptions appear to be based on the market information obtained by The Pathfinders and the survey and interviews they conducted. While The Pathfinders present this information along with information regarding site selection, business location factors, target identification, and lease rate analysis, they fail to develop a clear link between the information and their conclusions regarding absorption levels and lease rates as would typically be observed in a standard market capture analysis.

Certainly Memphis is and has been a very dynamic and strong market over the last several years. This trait is reflected in the information presented by The Pathfinders, as well as in information gathered by CERL during its review of this application and redevelopment plan. The Depot's unique location in the Downtown/Midtown submarket closely proximate to the vital Airport/Southeast submarket and major transportation facilities make it well positioned to take advantage of this strong market. There is every reason to believe that the redevelopment of DDMT will attract significant interest from companies looking for economical, well-located second generation space.

When the strong net absorption of the area is factored in with the locational advantages and economical cost of Depot space, it is CERL's opinion that the more attractive facilities such as the Typical Six and Buildings 360, 560, and 835 will experience significant early absorption while the Typical Twenty will require the better part of the 15-yr business plan period to be fully absorbed.. Commercial brokers suggested that, if priced correctly for the Memphis market for second generation space and not below the existing market, market support would be strong for the Depot space. This fact was confirmed in discussions with the MDRA. In CERL's opinion, even though the reuse plan and EDC Application fail to develop a clear link between the information presented and the absorption and lease rate conclusions, they reflect reasonable assumptions confirmed by CERL based on the analysis of supplemental data and discussions with sources familiar with the Memphis industrial market and the Depot facility strengths and weaknesses.

In addition to an analysis of the industrial lease rates and building absorption, CERL investigated the market for industrial land sales in the Memphis Metropolitan Region. The reuse plan includes the development of 161 acres of land for future development primarily in the west end of the Depot. Although the reuse plan and application assume there are no land sales over the 15-yr

period of the business plan, CERL believes that the market can absorb these land parcels over the life of the business plan. The Memphis land market has been active over recent years with both end users and developers. Recent sales have ranged widely in price from approximately \$7,500 per acre for unimproved sites to over \$72,000 per acre for improved sites with utilities and drainage in parcel sizes from 19 to 260 acres. Local brokers suggest that, in the Downtown/Midtown market, there is little if any land available for development. They also state that the sizes of the parcels being developed in the Depot are perfect for the smaller company looking to relocate and expand its operation. The size and economy of these parcels should help drive the demand for this west-end development. CERL was able to identify a comparable land sale to help in determining a market value for these developed parcels. The comparable property had similarities with respect to age, use, and location. In 1990, Roadway Packaging Systems purchased 37.28 acres of vacant, graded, and improved land for approximately \$38,600 per acre. Based on this sale and information gathered through discussions with the local brokers, CERL feels confident that the MDRA, if they actively market the land parcels, could receive an average \$35,000 per acre and see the land fully absorbed over the life of the business plan.

Finally, CERL analyzed the Memphis market with respect to the market segmentation between distribution/service and light manufacturing/assembly. While 75 percent of the industrial inventory in the market is distribution/service and this segment accounts for 96 percent of all space absorbed in 1997, manufacturing has played a more significant role in the economy when one looks at criteria other than absorption. An analysis of major new and expanded industrial projects for 1995-1998 shows that manufacturing accounted for 16 percent of the new jobs created, 19 percent of the square feet occupied and 34 percent of the capital investment. Also, in discussions with the MDRA, it was learned that most of the interest to date in Depot buildings has been from manufacturing companies.

Office.

The MDRA makes no assumption regarding office space as part of its reuse plan. None of the buildings to be developed under the reuse plan are to be used for office space other than to include small areas to service the operations within those buildings. However, office market activity is often useful to consider because of the broader economic implications it presents to a local economy such as employment, personal income, and investment.

The Memphis metropolitan office market has shown positive growth over the last several years and that trend is expected to continue. The market showed positive net absorption in 1997 with an increase in the metropolitan Memphis occupancy rate to approximately 88 percent, an increase of 0.62 percent over 1996. Also, the weighted average rental rate for the metropolitan Memphis market area rose to \$14.82, an increase of \$0.60 over 1996. The Class B and C office space with which the Depot would most likely compete showed robust gains in both rental rates and net positive absorption. Class B office space rental rates increased by \$0.41, to \$12.58 SF, while Class C space increased by \$0.58, to \$9.29 SF in 1997. Class B and C space exhibited positive absorption rates of approximately 40,000 SF and 141,000 SF, respectively. In the Airport/Southeast and Midtown submarkets, the office occupancy rates increased almost five percentage points in each submarket.

Residential.

DDMT is in the Depot District residential submarket that is characterized by the lack of even fair quality single or multi-family housing. The current housing stock is blighted and existing apartments are designated as low income. The closest quality housing is in nearby Bartlett where the market is very tight and rents are more than \$800 for modest three bedroom units. This is reflective of the exceptionally strong Memphis Metropolitan Region residential housing market that has shown strength over the past decade. Bolstered by the strong growth of the regional economy and the low interest rate environment, the outlook for the residential market remains positive.

Revenue and absorption assumptions.

The MDRA has projected that its only significant source of continuing revenues over the life of the Business Plan will be from the leasing of the existing buildings remaining after demolition and the associated CAM (Common Area Maintenance) fees. They have projected CAM revenues to reflect the actual costs of maintaining the common properties (grounds, street, lighting, etc.) and providing common area security (including entrance gates). As such, these revenues are merely offset by the actual operating expenses incurred related to providing these services.

Minimal revenues are anticipated from local matching funds and short-term and seasonal leasing activities throughout the business plan. During the early years of the business plan, the MDRA is also reflecting the receipt of Office of Economic Adjustment (OEA) monies to offset administrative costs by 75 percent in Year 1, 50 percent in Year 2, 33 percent in Year 3, and 17 percent in Year 4.

Note that, in the absence of any cooperative maintenance agreement with the Army, the MDRA has not reflected the receipt of any DLA monies. These revenues projected in the business plan reflect the nearly full leasing of the "Korean Typical" buildings and Buildings 360, 560, and 835 by Year 6 and the slower, but steady leasing of the Typical Twenty buildings beginning in Year 3 and progressing to the leasing of 14 of the 16 Typical Twenty by Year 15 of the business plan CERL findings for revenue and absorption assumptions.

CERL is in basic agreement with the MDRA's Business Plan with regard to the absorption of the existing building square footage and the lease rates that have been used to calculate revenues associated with the resulting leases. The current strong market for manufacturing/assembly and warehouse/distribution space in the Memphis area, the locational advantages enjoyed by the Depot, and the capital improvements to be made to the buildings and site lead reviewers to believe that the early interest in Depot buildings will continue. The support of the local brokerage community will help with lease up during the early years of the business plan. Brokers have indicated that the MDRA is pricing the space correctly for the existing market and therefore should not run into any resistance from the brokerage community, which they say would be the case if the MDRA were to price their space significantly below the current market.

During the recast of the MDRA's pro forma by CERL, it was noted that the MDRA had incorrectly reflected some business plan assumptions in the financial pro forma. Specifically, their assumptions related to lease renewal and/or rental escalations upon releasing of space at the end of the initial lease period were not accurately reflected in either the absorption schedule (EDC Application, section 7, p 8) or cash flow projections (EDC Application, section 7, p 6).

Business plan assumptions include that "a 10 percent vacancy factor is included in all renewals from Year 6 onward"* and that renewal rates in Year 6 and new lease rates in Year 11 are escalated by a factor of 1.13[†] are inconsistently applied in Years 6-15 in both schedules. This inconsistency, in effect, overstates absorption during these years and, as a consequence, overstates revenues (including the effect of the incorrect application of the escalation factor). The net effect of the absorption error is to overstate total area leased in Year 15 by 93,815

* EDC Application, section 7, pp 7 and 9.

† Ibid, p 9.

SF. The MDRA shows 3,200,173 SF leased at the end of Year 15, whereas the CERL recast shows leased square footage at 3,106,358.

While the difference is only 2.9 percent of leasable square footage at Year 15, it amounts to approximately \$1.03 million lease revenue in the final year of the business plan. The cumulative impact on revenue over the 15-yr projection period is approximately \$4.5 million in lease revenues. CERL was able to track the assumption errors in the MDRA's Business Plan and make the corrections necessary to properly reflect the assumptions in its recast of the MDRA's Business Plan. Since CERL has accepted the MDRA's absorption assumptions and the lease rates that have been used to calculate revenues, corrected as above, there is no difference in the lease revenue recast numbers of the MDRA or the CERL scenario.

The one area in which CERL differs significantly with the MDRA is with regard to the absence of land sales. The EDC Application specifically states that one of its assumptions is that only leasing occurs and there are no sales recorded during the period (EDC Application, section 7, p 7). However, as discussed later, there is a substantial investment in the development of land parcels ranging in size from 4 to 15 acres in the west end of the Depot. Showing no sales for these parcels substantially understates the revenues in the business plan and has a material impact on its valuation.

In conducting interviews with the local brokerage community and reviewing the demand for and availability of small parcels such as will be developed at the Depot, it was apparent that demand for these types of parcels is significant in the current market, especially for the smaller manufacturing/assembly and distribution/service business looking to expand its operations. Based on the comparable information presented above and information gathered through discussions with the local brokers, CERL feels confident that the MDRA, if they actively market the land parcels, could receive an average \$35,000 per acre and see the land fully absorbed over the life of the business plan. The CERL scenario assumes that 10 acres are absorbed each year beginning in Year 3. Total revenue recognized over the life of the business plan would be in excess of \$4.5 million. Even if these sales were not recognized over the projection period, there would be a residual value at the end that has not been recognized by the MDRA. In essence, they have set aside this land and assigned no value to it in the business plan, while investing capital dollars in it for improvements.

Operating expenses.

The business plan clearly details the assumptions for the operations and maintenance expenses of the MDRA's redevelopment of DDMT. The MDRA's Business Plan cost estimates break down almost equally into one of three major categories: (1) operations (including administration, marketing, and commissions), (2) maintenance of unoccupied facilities, and (3) CAM. Actual percentage breakdowns of costs over these three categories in the business plan period are 32.2, 37.2, and 30.6 percent, respectively. Collectively these costs total \$28.2 million over the 15-yr horizon.

Operations costs are highest in the early years of the business plan, reflecting the initial efforts in marketing the redevelopment of the Depot and the commissions due on the early leases. The maintenance costs of unoccupied buildings begin in Year 3 as property is transferred to the MDRA at their highest levels and then reduce annually through the end of the projection period as building space is absorbed and the costs of maintenance are transferred to building tenants. The MDRA has estimated the carrying costs for unoccupied buildings to be \$0.73 SF, which encompasses costs for taxes, insurance, security, maintenance (both common and building specific), management, pest control, and miscellaneous. The common area component is estimated at \$0.24/SF and used for calculating the common area costs for buildings as they are leased and those costs are billed to tenants. A further assumption made by the MDRA with regard to CAM is that the costs associated with leased buildings are billed to the tenant at the direct cost to the MDRA and thus are directly offset and treated as revenue neutral to the business plan as mentioned above.

CERL findings for operating expenses.

CERL is in basic agreement with the MDRA's Business Plan with regard to the operating expenses and the significant components presented in the business plan. In recasting the business plan using the assumptions in the EDC Application, CERL was able to reproduce the MDRA's number within 0.5 percent, with only small differences in classification between maintenance of unoccupied buildings and CAM. These differences were due to the issues discussed above related to the corrections CERL made in the application of the MDRA's absorption assumptions.

Infrastructure improvement costs.

The EDC Application presents a scenario of infrastructure improvements totaling over \$42.6 million. Major components of this capital program are (1)

infrastructure (roads, parking lots, utilities, landscaping, etc.) - \$21.2 million, (2) building improvements - \$10.8 million, (3) demolition - \$6.7 million, and (4) contingency - \$3.9 million. The program consists of six phases, with approximately \$29.0 million (68 percent) being invested in the first 6 years of the business plan (Appendix B, Table B.3).

Per the EDC Application, capital improvements will be financed using a combination of lease revenues and Federal grant funds to the extent available (EDC Application, section 8, p 1). However, no Federal grant funds are reflected in the business plan pro forma. The MDRA assumes that all financing is provided through bond funds advanced by the City of Memphis and Shelby County, with the resulting debt service to be paid with lease revenues. The term of the bond financing is assumed to be 20 years with an interest rate of 7 percent, and 6 percent loan costs. The details of the borrowing and subsequent debt service are shown in the borrowing schedule presented in the EDC Application (Section 7, p 21). The assumption in this schedule is that bonds in the amount of the capital expenditures will be issued each year and the proceeds used to fund those costs. The debt service required to service the repayment of these bonds grows from \$0.82 million in Year 2 to approximately \$4.3 million in Year 15. At the end of Year 15, the principal balance remaining on these bonds is approximately \$28.1 million. Table B.4 in Appendix B contains a recast of the MDRA's debt service plan.

To assist with the technical review with respect to infrastructure improvements, CERL engineers conducted a site visit of the Depot where they completed a thorough review of the MDRA's capital improvement program as well as an independent condition assessment. The results of this assessment and review of the proposed capital improvement program are presented in detail in Chapter 5, **Need and Extent of Proposed Infrastructure Improvements.**

CERL findings for infrastructure improvement costs.

CERL believes that the capital improvement program as presented in the EDC Application is consistent with the reuse plan developed by the MDRA, with one notable exception. The reuse plan and the EDC Application both exclude the North Depot Area known as Dunn Field from the surplus area. However, the infrastructure costs include over \$2.6 million related directly to improvements to be made on Dunn Field. The application contains no discussion or justification as to why these costs are included. Also, it should be noted that, in general, an inadequate level of detail was presented for many of the infrastructure costs. This lack of detail made it extremely difficult to review the MDRA's estimates and determine the need and extent of the proposed improvements. Therefore,

CERL engineers had to do a significant amount of investigation in their review, including contacting utility companies in the Memphis area and demolition companies to verify costs or obtain the information necessary to adequately analyze the data.

CERL also had to make assumptions using their knowledge of prior redevelopment plans as a basis for developing costs for comparison and evaluation with respect to the MDRA's plans. The net result of CERL's analysis is to significantly reduce the capital expenditures needed to accomplish the redevelopment proposed by the MDRA. Using a 30 percent contingency, CERL determined the infrastructure improvement costs necessary to accomplish the redevelopment proposed by the MDRA was \$36.0 million, which is nearly \$6.0 million less than the MDRA's numbers. This difference has a significant positive impact on the valuation of the business plan and is quantified later in the discussion of the CERL1 scenario.

Summary of cash flow and net present value.

The business plan presents minimal information and discussion regarding the NPV of discounted cash flow or the estimated FMV presented in the EDC Application. In sum, the Cash Flow Projections spreadsheet (EDC Application, section 7, p 6) and the Property Valuation – Income Approach All Facilities (EDC Application, section 7, p 15) contain significant inaccuracies in the methodologies used to determine the values presented.

First, the Cash Flow Projection spreadsheet presents a Summary and Conclusion that calculates NPV of annual cash flows over the 15-yr period as \$3,168,200 when discounted at 15 percent. The analysis presented then reduces this amount by the unretired debt at the end of the 15-yr period, \$22,891,800, to arrive at a value of real estate less residual debt equal to *negative* \$19,725,600. This projection is also presented as the NPV of the business plan in the introduction to Section 7 of the EDC Application.

The Property Valuation – Income Approach All Facilities purports to present a valuation based on the income approach. The valuation properly calculates the NOI and capitalizes this at a discount rate of 15 percent to arrive at a valuation of \$42,886,800. It then properly reduces this amount by the cost of the capital improvements necessary to generate that valuation (\$42,626,304). However, it also further reduces this valuation estimate by interest on capital debt (\$41,154,225). Reducing the capitalized NOI valuation by the capital expenditures and the interest on capital debt, the MDRA arrives at a FMV of

negative \$40,893,729, which is referred to in the introduction to Section 7 as the Discounted FMV.

While the MDRA has gone through the process of presenting information to determine these valuations (*negative* \$19,725,600 and *negative* \$40,893,729), they do not present any final determination of the valuation of their application nor do they make any proposed offer of compensation to the Army for the property to be transferred under the EDC.

CERL findings for cash flow and net present value.

CERL has found several significant errors in methodology in both of the valuation methods presented by the MDRA. In the case of the NPV of Annual Cash Flows over the 15-yr period, the MDRA used the correct methodology in calculating the discounted value of the yearly cash flows reflected in its cash flow projection spreadsheet. However, at that point it makes two crucial errors in methodology, one of inclusion and one of exclusion.

First, it has incorrectly reduced the NPV of annual cash flows by the amount of the unretired debt at the end of Year 15. Even if it were correct to do this, they failed to discount the debt balance back to present value terms as they did the annual cash flows. Second, they have not determined a residual value of the business plan assets by capitalizing the NOI at the end of Year 15. At that point, NOI generated from leasing activities is stabilized and should be capitalized to determine a value of the reusable buildings at Year 15. An implicit assumption embedded in the business plan is that the MDRA will cease its redevelopment of DDMT in Year 15 due to full build-out and the achievement of job creation goals. Accordingly, it is only reasonable to assume that the MDRA would have little choice other than to sell leased buildings to outside investors. Sales to investors in Year 15 would then be applied to the retirement of outstanding principal borrowed, and the residual would be discounted back to present value. Correcting for these methodological errors, the NPV of Annual Cash Flows increases dramatically from *negative* \$19,725,600 to *positive* \$6,037,811, all other assumptions held constant.

As for the Property Valuation – Income Approach All Facilities, the MDRA has made two major errors in its calculation of the valuation of *negative* \$40,893,729. First, although the applicant has correctly treated the capital costs by reducing the capitalized value of the NOI, capital costs of \$2.6 million related to Dunn Field (which has not been requested by the MDRA) have been included. More significantly from a methodological approach, the MDRA has further reduced the NOI capitalized value by the capital interest costs. This reduction should not be

made, as the inclusion of the capital costs fully reflects the capital cost adjustment needed to achieve stabilized NOI levels. In essence, the Income Approach is a valuation of the FMV at today's revenues and costs. Including interest on capital costs introduces an element of the discounted cash flow analysis. Again, correcting for the MDRA's shortcomings relating to the Dunn Field capital costs and correcting methodology with respect to the capital interest, the Property Valuation – Income Approach All Facilities increases from *negative* \$40,893,729 to *positive* \$2,900,496.

CERL-Developed Scenarios

Based on the above findings, CERL developed two scenarios to provide an analysis of the impact to the income streams and the resulting NPV ranges.

CERL1 Scenario.

CERL's first scenario was developed using the following assumptions (Table B.6):

1. The MDRA's absorption assumptions related to leased space, lease rates, and vacancy were used as corrected for computational errors.
2. CERL-developed infrastructure costs (including a 30 percent contingency) were used instead of the MDRA-developed costs. As presented above, CERL developed infrastructure costs of \$36.0 million versus MDRA costs of \$42.6 million.
3. A reversion value was included in the NPV reflecting the potential sale of reusable buildings at the end of the business plan period.

CERL2 Scenario.

CERL's second scenario used the same assumptions as detailed above, except that full land absorption via sale of the parcels developed in the West End of the Depot was assumed beginning in Year 3 and occurring evenly through Year 15. The MDRA showed no land sales in its Business Plan (Table B.7).

Scenario and Sensitivity Analysis.

Table B.8 in Appendix B summarizes CERL's scenario impact findings. This table summarizes the impact to revenue, infrastructure costs, debt service requirements, and NPVs (including residual value) of the CERL-developed assumptions versus the MDRA's Business Plan.

CERL findings for scenario and sensitivity analysis.

The sensitivity of changes to the MDRA's Business Plan assumptions can be seen immediately by reviewing Table B.8 in Appendix B. These differences in scenarios are significant. First, just correcting the MDRA's mathematical and methodological errors, discussed at length above, increases their business plan valuation from *negative* \$19.7 million to *positive* \$1.5 million when using a discount rate of 18 percent and \$2.8 million at a discount rate of 15 percent; positive changes of more than 108 and 114 percent, respectively.

The incorporation of the CERL assumptions in scenarios 1 and 2 above increase the business plan valuation even more dramatically. The CERL1 scenario does not change revenues or operating costs from the MDRA's numbers. However, a substantial increase in value is realized because of the \$6.6 million decrease in infrastructure cost (per CERL engineer analysis) and the \$6.0 million reduction in debt service costs. Incorporating these changes, with the corrections made in the recast of the MDRA's Business Plan, increases valuation at a 16 percent discount rate to over \$3.1 million and at a 13 percent discount rate to over \$6.0 million.

The CERL2 scenario makes only one assumption change to the CERL1 scenario, full absorption of the developed land parcels in the west end of the Depot. This assumption has an impact on business plan revenues of over \$4.5 million over the projection period. These changes, with the corrections made in the recast of the MDRA's Business Plan and the incorporation of the assumptions made in the CERL1 scenario, increase valuation at a 16 percent discount rate to over \$4.8 million and at a 13 percent discount rate to over \$8.0 million.

Financial Feasibility Analysis and Conclusion

CERL finds that, under all scenarios from the recast of the MDRA's Business Plan to both CERL-developed scenarios, the reuse plan as developed by the MDRA and modified by CERL has significant value and is financially feasible. The MDRA has obtained a major commitment from both the City of Memphis and Shelby County to fund the infrastructure as needed to accommodate the reuse plan. The MDRA has spent considerable time and effort to develop a plan that takes advantage of the physical, locational, and market advantages of the Depot. CERL finds that the NPV of the Business Plan as proposed by the MDRA ranges from \$1.5 million to \$2.8 million. The range of values for the CERL1 scenario ranges from \$3.1 million to \$6.0 million and for the CERL2 scenario from \$4.8 million to \$8.0 million.

5 Need and Extent of Proposed Infrastructure Improvements

Prepared by:

Jane DeRose, Infrastructure Management Analyst

Jeffrey G. Kirby, General Engineer

CERL, ATTN: CN-B

P. O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511, x6350/6730

Sam Hunter, Civil Engineer

David T. McKay, Civil Engineer

CERL, ATTN: CF-F

P. O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511, x3480/3495

Objectives

This chapter has two objectives:

1. CERL determines if the MDRA-proposed costs for the scope of work identified in the reuse plan fall within the range of reasonableness by means of an independent estimate.
2. CERL presents its own infrastructure improvement scenario based upon needs and extent identified during a site visit to DDMT; and upon data collected and delivered to CERL by DDMT Caretaker staff.

Approach

CERL uses the following four-step methodology in conducting an evaluation of MDRA infrastructure requirements identified in the EDC proposal.

Step 1: Upon receipt of the EDC Application and Reuse Plan, a data call is sent to the onsite staff. A detailed review of the EDC Application and Reuse Plan is made by the CERL EDC engineering team. This review provides an overview of the condition of the installation's infrastructure (from the applicant's perspective), goals of the proposed reuse plan, and the magnitude of the capital improvement plan that the applicant feels is necessary to encourage growth. This information is used to develop a general strategy for the site visit conducted in *Step 2*.

Step 2: The CERL EDC engineering team conducts a site visit. (The site visit to DDMT occurred on 17-20 May 1998.) While there, they conduct an evaluation of the installation's major infrastructure systems. In general, the infrastructure evaluation includes:

- a. Inspection of the site infrastructure in order to perform a condition assessment on existing buildings (structural components, roofing, HVAC, gas-water-electrical systems, fire protection, interior furnishings and compliance with Americans with Disabilities Act [ADA]), parking lots, roads, railroad, utilities (gas, water, electric, storm drain, and sanitary sewer), grounds, landscaping, security, and other infrastructure elements as applicable. Offsite areas where the LRA reuse plan specifies infrastructure improvements are visited.
- b. Interviews with site engineering staff; includes the collection of onsite documentation such as real property inventory, master plans, engineering studies, as-built drawings, records of maintenance and repair activities, as well as any other applicable documentation.
- c. Identification of the need and extent of repair requirements to bring conditions to appropriate levels for conveyance. Appropriate condition levels are determined by compliance with safety codes, fire codes, health codes, abutting community standards, and best engineering judgement (see *Step 3*).
- d. Identification of functional limitations of site capacity and/or performance as imposed by current state of infrastructure.

Step 3: CERL analyzes the field data, using a synthesis of the findings from the field surveys, interviews, maintenance records, and other collected documentation to:

- a. Establish existing infrastructure condition levels.

- b. Identify the infrastructure improvements required to meet projected capacities as specified in the LRA's reuse plan.
- c. Identify the infrastructure improvements required to attain appropriate condition levels for conveyance as determined by best engineering judgement of the CERL EDC engineering team.
- d. Scope and develop the necessary combination of mini-projects to improve or maintain the infrastructure condition levels, or otherwise alter the infrastructure to accommodate and meet the condition and capacity levels projected in the LRA's reuse plan (e.g., "Replace Roofing Bldg #229 With Single Ply EPDM").
- e. Scope and develop the necessary combination of mini-projects to improve or maintain the infrastructure condition levels, or otherwise alter the infrastructure to attain appropriate condition and capacity levels for conveyance as determined by the best engineering judgment of the CERL EDC engineering team. These results are used in *Step 4* to check the reasonableness of the EDC Application's proposed scope and the associated cost estimates.

Step 4: CERL uses the results and findings of *Steps 1, 2, and 3* to review the scope and costs of the LRA's proposed infrastructure improvements:

- a. An independent cost estimate of the LRA-proposed improvements is developed to validate the submitted cost estimates. This step is referred to later in this chapter as the CERL Estimate or sometimes referred to as the "Apples to Apples" estimate. The CERL Estimate is matched as closely to the LRA estimate as the available data will allow. This task is often difficult because one must frequently guess at what the LRA is proposing when an appropriate level of detail is not provided. *Cost Estimating Tables* (R.S. Means®, Kingston, MA) are used, all unit costs are described via R.S. Means line numbers. For each line number, the "Total Cost" including overhead and profit margins are used. Materials tax burdens are not calculated. The final costs are adjusted according to the R.S. Means *City Costs Indexes*, using their "Total Weighted Average" index. For the city of Memphis, TN, the total weighted average city cost index is 85.9 percent (i.e., estimate totals are multiplied by 0.859 [R.S. Means *Facilities Construction Cost Data*, 1998, p 1095]).

- b. Another cost estimate (using R.S. Means tables) is prepared for the plan deemed most appropriate for conveyance by the CERL EDC engineering team. This plan is referred to as the CERL Scenario. Its numbers are scaled by the R.S. Means city cost index but, in addition, 10 and 30 percent contingencies are added to cover omissions of minor steps in the construction or repair process that may have occurred in the CERL Scenario models.

These engineering findings and cost estimates are forwarded to the CERL community planners and economists who incorporate the results into their specific analyses associated with the EDC evaluation. This part of the review process helps to determine if the LRA-proposed infrastructure improvements are necessary to provide the proposed functional requirements. These results are also used to assist in modeling the investments and resultant economic growth of the facility and its surrounding community. The differences between the LRA infrastructure improvements estimate, and the two CERL estimates described above, are the focus of this chapter.

Overview of LRA Proposal for Reuse of DDMT

According to the MDRA, the EDC Application addresses 495 acres of the DDMT site, but excludes 83 acres of land to be conveyed under a PBC, and does not include 64 acres on Dunn Field north of Dunn Avenue.* A 14.8-acre easement for aboveground power transmission lines on the east end of the site is included in the reuse plan but is not considered for redevelopment. The EDC Application and the Reuse Plan appear to offer conflicting information in several places, but this ultimately does not have an adverse impact on the engineering analyses performed for this evaluation. Excluding the PBC inventory and the fire pump station (#756), after scheduled building demolition is completed the site will consist of warehouses and open ground. Railroad, pavement, gravel, and grass now cover approximately half the grounds, with all but one of the warehouses (#835) located primarily on the eastern two-thirds of the property.

Several alternatives for the property were considered, but the MDRA's preferred alternative targets a combination of light industrial, warehousing, and

* Elsewhere in the EDC Application and within the Reuse Plan, Dunn Field is included; however, the environmental remediation required at Dunn Field prevents any development there for several years.

distribution uses. The warehouses will immediately support manufacturing and distribution while the west end is intended for new industrial development, to be completed at a later time. Proposed improvements described later in this chapter include perimeter landscaping, signage, internal road signs, sanitary sewer, water distribution, telecommunications, electrical system, stormwater system upgrade, natural gas system upgrade, internal roadways, parking lots, building enhancements, and demolition. The MDRA's preferred alternative comprises these collective improvements.

The MDRA's preferred plan is scheduled to be executed over six phases. Five 2-yr phases cover 1998 through 2008; the last 4-yr phase ending in 2012 covers development of Dunn Field. The MDRA costs estimate is described by phase in the table "Memphis Depot Reuse Capital Improvement Program," Section 7, pp 19-20, of the EDC Application, and is repeated (with one notable error *) in the Reuse Plan on pp VII.15-17. Henceforth, this table is referred to as the MDRA Capital Improvement Table. A table comparing the summary infrastructure improvement cost estimates provided by the MDRA to those estimates developed in the CERL estimate and those of the CERL scenario (displayed with 10 and 30 percent contingencies) is presented in Table 5.1; phases are not shown in this table. For comparison purposes, the CERL scenario is phased in proportional amounts of dollars per phase equaling, in proportion, the amounts proposed by the MDRA. These figures are contained in Chapter 4, **Business Plan Review and Market and Financial Feasibility Analysis**. The models used by CERL in developing these estimates are provided in Appendix C.

* See line item for Natural Gas System Upgrade — the estimated totals do not agree between the two examples.

Table 5.1. Summary comparison of MDRA and CERL infrastructure improvement estimates.

Project Description		CERL Estimate		CERL Scenario	
<i>Infrastructure</i>	LRA	Low	High	Low	High
<i>Perimeter Landscaping</i>					
Landscape Buffer	\$330,000	\$327,000	\$387,000	\$186,000	\$220,000
Wrought Iron Fence on Airways Blvd	\$165,000	\$118,000	\$140,000	\$78,000	\$93,000
Entrance Landscape	\$55,000	\$55,000	\$64,000	\$55,000	\$64,000
Interior Landscaping	\$220,000	\$276,000	\$326,000	\$121,000	\$143,000
Street Trees	\$440,000	\$446,000	\$527,000	\$320,000	\$378,000
Parking Lot Landscaping	\$137,500	\$147,000	\$174,000	\$105,000	\$124,000
<i>Signage</i>					
Main Entrance	\$22,000	\$21,000	\$25,000	\$20,000	\$25,000
Sign at Airways Blvd. and Dunn Avenue	\$22,000	\$21,000	\$25,000	\$13,000	\$15,000
Secondary Entrances	\$11,000	\$10,000	\$12,000	\$29,000	\$34,000
<i>Internal Road Signs</i>	\$33,000	\$34,000	\$40,000	\$34,000	\$40,000
<i>Sanitary Sewer Upgrade</i>					
Inspection Report, Tape, etc.	\$385,000	\$300,000	\$354,000	\$243,000	\$287,000
Removal/Replacement of pipes/mains	\$792,000	\$750,000	\$872,000	\$227,000	\$273,000
Structures	\$247,500	\$255,000	\$300,000	\$125,000	\$149,000
Service lines	\$165,000	\$55,000	\$65,000	\$39,000	\$46,000
<i>Water Distribution Upgrade</i>	\$275,000	\$243,000	\$287,000	\$0	\$0
System modifications	\$825,000	\$767,000	\$907,000	\$610,000	\$722,000
Removal and Installation of Fire hydrants	\$880,000	\$819,000	\$968,000	\$244,000	\$287,000
Meters/connections	\$770,000	\$169,000	\$200,000	\$169,000	\$200,000
<i>Telecommunications Upgrade</i>	\$715,000	\$591,000	\$697,000	\$126,000	\$150,000
<i>Electrical System Upgrade</i>	\$330,000	\$287,000	\$340,000	\$0	\$0
Electrical Pole Removal/Installation	\$660,000	\$647,000	\$765,000	\$151,000	\$179,000
Single and three phase primary removal/Installation and Riser Installation	\$412,500	\$371,000	\$438,000	\$223,000	\$263,000
Single and Three phase transformers removal/installation	\$412,500	\$341,000	\$404,000	\$273,000	\$323,000
Underground Extension	\$1,100,000	\$914,000	\$1,080,000	\$410,000	\$484,000
Metering (25 S-12 & s-18 Meters) & Removal of primary meters	\$330,000	\$141,000	\$167,000	\$141,000	\$167,000
<i>Storm Water System Upgrade</i>	\$275,000	\$265,000	\$313,000	\$0	\$0
Existing System modifications	\$385,000	\$385,000	\$456,000	\$224,000	\$266,000
Removal/Installation of pipes and structures	\$275,000	\$276,000	\$326,000	\$30,000	\$36,000
Changes to system in area slated for future development	\$220,000	\$198,000	\$234,000	\$56,000	\$66,000
<i>Natural Gas Upgrade</i>	\$880,000	\$824,000	\$973,000	\$1,276,000	\$1,507,000

Internal Roadways					
Upgrade Boulevard (G Street), 1st Street South of G Street	\$990,000	\$1,045,000	\$1,236,000	\$953,000	\$1,125,000
New Road that parallels Dunn Avenue, upgrade 2nd Street	\$880,000	\$905,000	\$1,070,000	\$750,000	\$886,000
Upgrade 4th Street, J Street, 3rd Street	\$770,000	\$850,000	\$1,005,000	\$550,000	\$650,000
Roads on west side	\$2,255,000	\$2,458,000	\$2,905,000	\$1,408,000	\$1,665,000
Railroad removal	\$0	\$502,000	\$594,000	\$502,000	\$594,000
Parking lot construction	\$6,748,500	\$7,549,000	\$8,922,000	\$4,391,000	\$5,189,000
Buildings					
Main admin bldg 144 - code compliance	\$110,000	\$139,776	\$165,190	\$0	\$0
Main ad bldg 144 - fire suppression	\$220,000	\$155,027	\$183,213	\$0	\$0
Typical 20's buildings - code compliance	\$935,000	\$700,000	\$828,000	\$0	\$0
Typical 20's buildings - fire suppression	\$3,080,000	\$2,534,000	\$2,994,000	\$810,200	\$957,500
Typical 20's buildings - enhancements	\$4,125,000	\$4,074,066	\$4,814,805	\$4,074,066	\$4,814,805
Korean Typical buildings - code compliance	\$495,000	\$450,000	\$532,000	\$0	\$0
Korean Typical buildings - fire suppression	\$2,420,000	\$1,678,000	\$1,983,000	\$222,818	\$394,996
Korean Typical buildings - enhancements	\$440,000	\$586,276	\$692,872	\$390,851	\$692,872
Building 835 - code compliance	\$55,000	\$40,000	\$47,000	\$0	\$0
Building 925 - code compliance	\$0	\$0	\$0	\$0	\$0
Demo					
Bldgs 209, 359, 465, 467, 468, 469, 559	\$2,145,000	\$1,907,000	\$2,477,000	\$1,907,000	\$2,477,000
Bldgs 210, 308, 309, 319, 416, 417, 949 and minors	\$1,012,000	\$992,000	\$1,324,000	\$992,000	\$1,324,000
Bldgs 349, 449, 549, 649, 720, 737, 770, 771, 783, 787, 793, 860, 863	\$2,090,000	\$1,838,000	\$2,450,000	\$1,838,000	\$2,450,000
Bldgs 873, 875, 970, 972	\$1,760,000	\$1,902,000	\$2,916,000	\$1,902,000	\$2,916,000
Bldgs 995, 1084, 1086, 1087, 1088, 1089, 1090, 1091	\$330,000	\$261,000	\$348,000	\$261,000	\$348,000
Roofing Repairs/Replacement	\$0	\$0	\$0	\$3,000,000	\$3,000,000
TOTALS	\$42,630,501	\$40,619,145	\$49,353,081	\$29,018,770	\$36,025,173

CERL Evaluation of MDRA's Preferred Alternative

This section discusses each element of the MDRA preferred alternative infrastructure improvement plan. A description of the preferred alternative as listed in the EDC Application and the Reuse Plan is presented. A discussion of the need and extent of each improvement as determined by the CERL EDC engineering team follows. The summary costs for the MDRA preferred alternative, the independently developed CERL estimate for the same scope of work, and the CERL scenario estimate, are presented in line item format in Table 5.1. Models used by CERL in estimating the costs of each element and the total summary are presented in Tables C.1 through C.115.

Perimeter Landscaping

A dialogue detailing the improvements for perimeter landscaping proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements are inferred from the MDRA Capital Improvement Table and an artist's conception provided in Section 2 of the EDC Application. Interviews conducted with MDRA representatives during the DDMT site visit revealed that no detailed plan (i.e., a line item cost estimate) for perimeter landscaping exists. However, in general terms, the MDRA wishes to create more of a business park atmosphere consistent with higher-quality competing developments.

The MDRA specifies trees and grass planted along the north, south, and western boundaries of DDMT. A wrought iron fence is specified along Airways Boulevard on the eastern perimeter. Trees and grass are also included along road and parking lot improvements. Parts of Third and Fifth Streets among the northern World War II-era warehouses are replaced by a combination of parking and green space. Included in this proposed work are improvements to the two northern and one eastern entrance to DDMT. All guard houses and sentry stations are removed, with grass, trees, and signage replacing them. Also included is a 3.5 acre-ft retention pond with spillway and headwall on the west end of the Depot.

The CERL scenario contains the same improvements but uses half as many trees. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate. Models used by CERL in estimating the costs are found in Appendix C, Tables C.2 through C.11.

Signage and Internal Road Signs

A narrative detailing the improvements for signage and for the internal road signs proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements are inferred from the MDRA Capital Improvement Table and an artist's conception provided in Section 2 of the EDC Application.

Signs at the main entrance at Airways Boulevard and Dunn Avenue, and signs at the secondary entrances on Dunn are desired.

The CERL scenario does not differ in scope, but there is a difference in the respective cost estimates. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate. Models used by CERL in estimating the costs are found in Appendix C, Tables C.12 through C.16.

Sanitary Sewer

A narrative detailing the improvements for the sanitary sewer system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements could only be inferred from the MDRA Capital Improvement Table. However, interviews that were conducted with MDRA representatives during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes robotic inspections of both the sanitary and stormwater lines. A complete replacement of the sanitary system is proposed. The new system would bypass existing lift stations, which now move the sewerage to the northeast, and allow gravity to pull the flow to the Memphis Light Gas & Water (MLGW) sewer lines along the southern boundary of the site.

The CERL scenario replaces only 20 percent of the sanitary lines (by linear foot and pipe size) and 20 percent of the existing manholes. DDMT maintenance records and interviews with DDMT staff indicate a full replacement is unnecessary. The lift stations are in excellent condition, are well-maintained, and have a very long life expectancy. A 20 percent replacement of sanitary lines is considered liberal by CERL. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Models used by CERL in estimating the costs are found in Appendix C, Tables C.17 through C.22.

Water Distribution

A narrative detailing the improvements for the water distribution system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from the MDRA Capital Improvement Table. However, interviews that were conducted with MDRA representatives during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes to replace all fire hydrants and fire suppression valve houses, and to place water meters on each building. The MDRA believes water pressure is not sufficient to activate the sprinkler heads in all warehouses. Back calculations show the MDRA's estimate for such work is more than ample.

The CERL scenario replaces only one of the three valve houses per warehouse, 10 percent of the site's fire hydrants, and it installs water meters at all warehouses. Interviews with DDMT maintenance personnel, maintenance records, and engineering reports show that all warehouses exceed minimum water pressure requirements (from 50 to 90 psi) with the exception of Building 229 in the northeast corner of the site, which is just at the minimum required water pressure of 20 psi. This analysis assumes that the pump house (Building 756) will sustain the fire suppression system. It is not clear what will happen with the fire system after conveyance. It is assumed that the pressure supplied by MLGW will be adequate. Records indicate the pH content of the soil is not conducive to corrosion; however, DDMT staff recommends periodic inspections of the underground water pipes. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Models used by CERL in estimating the costs are found in Appendix C, Tables C.56 through C.74.

Telecommunications

A dialogue detailing the improvements for the telecommunication system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes abandoning the existing telecommunication system and replacing it with a T-1 line. The MDRA arrived at their estimate via discussions with Southern Bell. The MDRA considers the fire and intrusion detection adequate with no problems beyond that of being old.

The CERL scenario considers only the extension of existing telecommunication lines into the west end of the site. This conclusion is drawn upon discussions with Southern Bell, which indicates existing lines are adequate and need only standard maintenance and repair. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Models used by CERL in estimating the costs are found in Appendix C, Tables C.50 through C.54.

Electrical Systems

A dialogue detailing the improvements for the electrical system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from the MDRA Capital Improvement Table. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA asserts the street lighting and dual power feed for the site are adequate. The MDRA intends to demolish and replace all electrical lines, utility poles, and transformers. An underground line is planned for the west end. An electric meter is to be installed on each building. The Square-D electrical panels are to be replaced.

The CERL scenario keeps existing lines and replaces 10 percent of existing utility poles and 25 percent of the transformers. Interviews with DDMT personnel and site inspection reveal 3-phase power is delivered site-wide via single-phase lines and internally constructed 3-phase grids; poles and transformers are well maintained and most are in good condition. An overhead line to the west end is deemed adequate to service future industrial uses. Meters are installed on each building. Three new electric panels replace Square-D panels inside each building. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Models used by CERL in estimating the costs are found in Appendix C, Tables C.23 through C.40.

Stormwater Upgrade

A narrative detailing the improvements for the stormwater system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from

the MDRA Capital Improvement Table. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA noted ponding of water at locations within DDMT; it also fears damage to existing stormwater structures will occur as a result of construction activities associated with road and parking lot improvements. Therefore, the MDRA proposes a general system upgrade. The upgrade includes the west end.

The CERL scenario does not replace any of the existing stormwater system as part of a general upgrade (with the exception of replacing a headwall on the southeast corner of the site, below the golf course). CERL could not verify significant ponding of water from physical evidence nor through interviews with DDMT personnel; further, the storm system's capacity to drain runoff is not now threatened or expected to be. However, many new catch basins and manholes are installed with the road and parking lot improvements. The existing storm structure is buried very deep below the surface and will not suffer adverse effects from road and parking lot construction. Precast concrete catch basins and manholes are removed and reset for economy; the number of new manholes and catch basins is liberal. Note that costs for new catch basins and manholes are accounted for in the sections on internal roads and parking lots. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Models used by CERL in estimating the costs are found in Appendix C, Tables C.101 through C.115.

Natural Gas Upgrade

A narrative detailing the improvements for the natural gas system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from the MDRA Capital Improvement Table. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes a full replacement of the natural gas lines and cathodic protection. CERL concurs that the natural gas lines and cathodic protection need replacement. Records indicate that 90 percent of existing natural gas valves have been replaced within the last 5 years. CERL has determined by back calculation that the MDRA's cost estimate as stated in the EDC Application (MDRA Capital Improvement Table) is only half of what is needed for full replacement. However, the MDRA estimate for the same line item as stated in the Reuse Plan is twice that stated in the EDC Application. This latter estimate

agrees well with that of the CERL scenario. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Models used by CERL in estimating the costs are found in Appendix C, Tables C.41 through C.49.

Internal Roadways and Parking Lots

Models used by CERL in estimating the costs for internal roadways and parking lots are found in Appendix C, Tables C.75 through C.100.

Roadways.

A narrative detailing the improvements for the internal roads system proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from the MDRA Capital Improvement Table and an artist's conception provided in Section 2 of the EDC Application. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes construction of improved roads after building demolition. A four-lane divided highway is to be constructed along G Street and extending due east past the warehouses to an extension of Tenth Street. Other streets including First south of G, Second, Third, Fourth, Fifth, E, F, J, and streets along the site perimeter and the west end are widened to two lane roads. Sidewalks, curb and gutter, catch basins, and manholes are provided along the roadways.

The CERL scenario matches the MDRA's proposed improvements with the exception of development of roads for the west end. Existing roads will serve adequately until development plans for the west end have been finalized. An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Parking lots.

A narrative detailing the improvements for parking lots proposed by the MDRA is not contained in the text of the EDC Application nor in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from the MDRA Capital Improvement Table and an artist's conception provided in Section 2 of the EDC Application. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes construction of parking lots after building demolition. Lots are to be constructed along C Street, between E and F Streets, south of G Street, west and south of the Korean War-era warehouses.

The CERL scenario constructs the same parking lots but is consistent with the topography of the ground and abutting fence lines. The parking proposed by the MDRA along C Street would have a very steep grade without significant amounts of earthmoving; a parking space along Ball Road is similarly impractical. Curb and gutter are not provided for these parking lots. New catch basins are liberally installed with existing catch basins being reset as necessary. It is assumed that all underlying storm and sanitary lines are not damaged by the construction.

An explicit comparison of the estimates cannot be made without a line item description of the MDRA estimate.

Buildings

A narrative detailing the improvements for the building enhancements proposed by the MDRA is not contained in the text of the EDC Application or in the Reuse Plan. Therefore, the MDRA's proposed improvements can only be inferred from the MDRA Capital Improvement Table. Interviews with MDRA representatives conducted during the DDMT site visit helped to clarify the MDRA's intentions.

The MDRA proposes improvements to 16 of the 20 WWII (Typical Twenty) warehouses (Bldgs 229, 230, 249, 259, 329, 330, 350, 429, 430, 450, 529, 530, 550, 629, 630, and 650) and the 6 Korean War-era warehouses (Bldgs 470, 489, 490, 670, 689, 690, and 685*) that occupy the northeast and southeast parts of DDMT, respectively (see Figure 3). Note that 4 of the 20 WWII-era buildings are slated for demolition (Bldgs 349, 449, 549, and 649) and two of the Korean War-era structures (Bldgs 689 and 690) have already been leased to the McCauley Candle Factory. Also included in the proposal are the main administration building (#144), the west end hazardous materials warehouse (#835), and the west end tent structure (#925). The MDRA estimates are based upon 16 WWII-era warehouses, 6 Korean War-era warehouses, and Buildings 144, 835, and 925. The CERL estimates are based upon the same array of structures. The CERL

* Bldg 685 is a small structure housing a conveyor system that connects Bldgs 689 and 690. For the purposes of this chapter, Bldg 685 is considered a subsection of the six Korean War-era warehouses.

scenario is based upon the same number of WWII warehouses but only upon four Korean warehouses; activities for Bldgs 144, 835, and 925 are not included in the CERL scenario, because the buildings are no longer included in the EDC request.

The MDRA specifies "Code Compliance" and "Fire Suppression" for Bldg 144. The CERL estimate specifies a new fire sprinkler system and ADA compliance via exit ramps, automatic door openers, elevator Braille pads, and bathroom fixtures. The installation of a new air-controlled boiler is modeled as is replacement of all radiators and radiator traps. Electrical switchboards, panels, and breakers are replaced after selective demolition and disposal, which is included in these costs. The CERL scenario includes no plans for Bldg 144 as it is scheduled for PBC.

The MDRA also specifies code compliance, fire suppression, and enhancements for the WWII-era warehouses. The CERL estimate specifies 100 percent replacement of all sprinkler heads, ductile iron pipe, and three valve houses per building. ADA compliance is modeled with an egress ramp and automatic door opener to each building's office area. The bathrooms are not included in the ADA compliance scope as a compromise, in that it is unlikely all 16 WWII buildings will require such compliance. The CERL scenario assumes a more intensive manufacturing reuse based on market findings provided in Chapter 4, **Business Plan and Market and Financial Feasibility**. To support a manufacturing reuse, CERL specifies replacement of three fire valve houses per warehouse (six total per building), 100 percent of all sprinkler heads, and replacement of more than 20 percent of building fire suppression piping. In addition, CERL made provisions to replace the fire control panels in each building. Based upon interviews with DDMT personnel and M&R records, this protection is adequate. No ADA improvements are included in the CERL scenario.

The scopes of work for the building enhancements of the WWII-era warehouses are the same for the MDRA preferred alternative, the CERL estimate, and the CERL scenario. Because of obvious signs of roof leakage (efflorescence and water stains on interior walls), the built-up roofs are replaced with single-ply membrane roofing with reglet flashing. Vertical cracks in all buildings are caulked with silicon caulking. Interior lighting is replaced with high-pressure sodium lamps (Bldg 629 already has new lamps). Three new electrical panels are installed (cost covered with electrical system upgrade) per warehouse. Office spaces are given new acoustic ceiling tiles, paint, and window air-conditioning units. Loading docks are provided new rubber bumpers and two automatic levelers each. Selective demolition and disposal of same is included in these costs.

The MDRA specifies "Code Compliance" and "Fire Suppression" for the Korean War-era warehouses. The CERL estimate specifies 100 percent replacement of sprinkler heads, ductile iron pipe, and valve houses. Based on interviews with DDMT personnel and the owners/operators of the McCauley Candle Factory (Bldgs 689 and 690) a 100 percent sprinkler head replacement is necessary. ADA compliance is modeled with an exit ramp and automatic door opener to each building's office area. The bathrooms are not included in the ADA compliance scope as a compromise, in that it is unlikely all Korean War-era buildings will require such compliance. The CERL scenario specifies replacement of one fire valve house per warehouse and 100 percent of all sprinkler heads. Replacement of ductile iron pipe is not included in the CERL scenario. The CERL scenario does not specify ADA compliance actions for the Korean War-era warehouses. The cost totals for the MDRA plan and the CERL estimate, shown in Table 5.1, are based upon six Korean War-era warehouses. The CERL scenario totals shown for the same line item are based upon four Korean War-era warehouses.

The MDRA also specifies building enhancements for the Korean War-era warehouses. The scopes of work for the CERL estimate and the CERL scenario differ only in that the latter is based upon four Korean War-era buildings instead of six. The flashing for the EPDM* single-ply roofing is to be replaced because excessive water stains and efflorescence on the interior concrete masonry unit walls indicate the roof is leaking. Office space is refitted with paint and acoustical ceiling tiles. Docks receive new rubber bumpers and four hydraulic levelers. Selective demolition and disposal of same is included in these costs.

The MDRA specifies "Code Compliance" for Bldg 835. The CERL estimate contains an exit ramp and automatic door opener for Bldg 835's office area. The CERL scenario has no plans specified for Bldg 835, which is a state-of-the-art hazardous materials storage warehouse.

A summary of the calculation used by CERL in estimating costs for building enhancements is found in Appendix C, Table C.55.

Demolition

The MDRA has scheduled the demolition of all buildings that are not slated for reuse or PBC. A negligible disagreement regarding square footage totals exists

* EPDM = ethylene-propylene-diene monomer (synthetic rubber membrane roofing material).

because of an inability to reconcile smaller and/or newer buildings with the available real property data (e.g., sentry stations); square footage totals used are the same as those used by the MDRA. The scopes of work for the CERL estimate and the CERL scenario are identical. Estimates are based upon information provided by Memphis area wrecking and demolition contractors who were solicited for estimates by telephone. Unit costs varied by category code from \$3.75/SF to \$5.00/SF.

CERL notes that demolition costs of existing railroad track, ties, and ballast are discussed in general terms but are not specifically addressed in the text. The track and ties have good potential for reuse. CERL recommends leaving some existing track for rail mode cargo. All results are tabulated in Table 5.1.

Conclusions

The MDRA proposes a total \$42.6 million for DDMT infrastructure improvements. The target industries for the site are light industry, manufacturing, and distribution. The CERL estimate for the same scope of work falls between \$40.6 million and \$49.3 million. Therefore, one may conclude the MDRA's estimate of the cost for its proposed work is reasonable. However, CERL's findings regarding the need and extent of improvements that are required to meet community standards and support projected capacity levels required for its designated usage range from \$29.0 million to \$36 million.

CERL concludes the \$42.6 million projected by the MDRA for DDMT infrastructure improvements is high. The major differences between the MDRA's preferred alternative and the CERL scenario are seen in the scopes of work. Where the MDRA calls for 100 percent replacement of most utilities (e.g., water distribution, fire suppression, or telecommunications) the CERL scenario specifies only partial replacement and upgrades. Estimates for roads and parking lots are closer to agreement than utilities but still appear high. Estimates for building enhancements are in agreement. CERL notes that most improvements are specified in very general terms, making explicit comparisons difficult.

6 Extent of State and Local Investment and Risk

Prepared by:

Jonathan D. Trucano - Community Planner

CERL, ATTN: CN-B

P.O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511

Background

Local investment in the redevelopment of DDMT will involve significant development costs including high capital expenditures, the majority of which arise from site and utility improvements. The EDC Application estimates total infrastructure costs of \$42.6 million (1998 dollars) programmed in six phases. These capital expenditures are to be financed by general fund support from the City of Memphis and Shelby County.

Given the capacity of the DDMT redevelopment effort to generate revenue and proposed fiscal packaging, it is the opinion of CERL that the MDRA's EDC Business Plan stands a reasonable probability of achieving financial feasibility and job creation goals.

Approach

CERL will discuss the extent of state and local investment risk associated with the redevelopment of DDMT, as well as the ability of the MDRA to implement the May 1997 Redevelopment Plan as proposed in the EDC Application.

Operational Investment and Risk

Investment

According to CERL's recast of the MDRA's Business Plan pro forma, revenues of \$78.6 million will be generated from real estate and OEA sources to offset operational expenditures of \$28.0 million throughout the 15-yr redevelopment period.* This estimation of total revenues does not include an additional \$4.6 million expected to be generated from the sale of land on the western portion of the installation. This stream of revenues results in a 15-yr cumulative net operating cash flow of *positive* \$50.6 million, which could theoretically be dedicated to capital improvement programming. The proposed level of operational investment is substantial but, in most cases, is critical to the successful redevelopment and marketing of the DDMT site and its facilities.

Risk

The MDRA's operational investments attempt to ensure that adequate resources will be available to meet the short- and long-term challenges of marketing the property and to instill the necessary level of confidence required by market participants to invest in DDMT. Operational risk is associated with the capacity of the site to generate revenue, otherwise known as market risk. So long as DDMT generates sufficient revenues to offset required operational expenses, risk is somewhat reduced. As the DDMT site begins to attract tenants for its facilities, its marketability increases, and the level of risk to the MDRA decreases in turn. As CERL noted in Chapter 4, **Business Plan Review and Market and Financial Feasibility Analysis**, the average operating expense ratio for the former DDMT is only 56 percent for the first 5 years of development, which includes a peak rate of nearly 79 percent in Year 3. The operating expense ratio over the entire 15-yr redevelopment period stands slightly above 33 percent, signifying a notably low level of operational leverage and risk attributable to the redevelopment of DDMT. As with any other large-scale development project, the greatest degree of operational risk exists within the early phases of development when revenues are nominal and operating expenses are high in an attempt to effectively market and manage the property. This risk is offset somewhat by the presence of funding grants from both the U.S. Economic Development Administration and the DoD OEA. These sources of

* Note that all figures presented from here on will be expressed in inflated dollars as opposed to current 1998 dollars.

revenue represent ways that enable the MDRA to reduce its total operational expenditure.

However, the level of operational risk borne by the MDRA should not be underestimated. As documented in Chapter 7, **Local and Regional Real Estate Market Conditions**, the planned redevelopment of the DDMT site faces significant market competition from alternative industrial sites; specifically in the southeast portion of the Memphis MSA. In addition, although the overall industrial market in the regional economy is generally strong, a perceived lack of labor supply might detrimentally impact any future expansion or relocation projects undertaken by industrial firms. Furthermore, it is important to recognize the risk inherent in the absorption numbers developed by both the MDRA and CERL. Any number of factors can produce a negative impact on the potential revenues generated from redevelopment, thereby reducing the level of net operating income available from which to finance future infrastructure improvements.

Capital Improvements

Investment

Chapter 5, **Need and Extent of Proposed Infrastructure Improvements**, provides an indepth discussion of the MDRA-proposed development infrastructure program provided in the EDC Application and reflected in the Business Plan pro forma. To summarize, the MDRA proposes the following major improvements (inflated dollars):

- \$21.2 million in infrastructure improvements, including: landscaping, signage, sanitary sewer, water, telecommunications, electrical, storm water, natural gas, roadway, and parking lot improvements
- \$10.8 million in building improvements
- \$6.7 million in demolition costs
- \$3.9 million in contingency.

In total, the MDRA proposes nearly \$42.6 million in total infrastructure development costs.

CERL was unable to independently verify total project infrastructure costs, although some individual improvements were found to fall within CERL's estimated range of cost reasonableness. CERL's estimated infrastructure costs under the CERL1 scenario total \$36.0 million, nearly \$6.6 million below the

MDRA estimate. The largest discrepancies were found in building, road, and electrical system expenditures.

Although CERL challenges the MDRA's proposed need and extent of development costs, CERL finds the timing of these improvements to be prudent and reasonable given that a 15-yr planning horizon is contemplated. Phased improvements in the early years of redevelopment will primarily improve building conditions, site transportation access, domestic water capacity, and sewer capacity. These early improvements are critical if the MDRA hopes to capitalize on the current strength of the market for industrial property and accomplish its absorption goals. CERL's market research indicates that the anticipated level of absorption in the early years of the redevelopment effort will be constrained only by the MDRA's capacity to bring its facilities and site amenities up to the level exhibited by competing sites.

The MDRA has proposed to finance these capital improvements exclusively by sale of bonds issued by the City of Memphis and Shelby County. This anticipated method of financing uses both General Obligation and Revenue bonds. The actual level of risk to the MDRA depends greatly on the type of bonds used; Revenue bonds depend solely on the financial solvency of the MDRA, while General Obligation bonds are backed by the full faith and credit of Shelby County and the City of Memphis, currently holding a AA+ bond rating. Furthermore, the financing strategy employed by the MDRA does not use the anticipated operating revenues generated by the redevelopment of DDMT, and places an undue level of risk on the entire business plan. Assuming the MDRA's projected 15-yr revenues of \$80.3 million and operating expenses of \$28.0 million, nearly \$52.2 million in operating cash flow remains for development costs. Even using the MDRA's estimate of \$42.6 million in capital improvement expenditures, the business plan results in a 15-yr cumulative cash flow surplus of *positive* \$7.5 million.

Risk

The amount of investment and risk is indeed substantial, as evidenced by the MDRA's proposed commitment to over \$40 million in estimated infrastructure improvement costs. Accordingly, infrastructure risk rests with the fiscal capacity of the MDRA and the revenue generating capability of the DDMT EDC reuse effort in general. Market analysis has demonstrated a potentially reasonable stream of demand for warehouse/distribution and light manufacturing real estate products; thus, the risk associated with completed infrastructure improvements and insufficient end-user demand is somewhat abated.

Because of the capital-intensive nature of the redevelopment effort, the MDRA is not realistically able to phase capital improvements to limit the risk involved. Almost 40 percent (\$16.7 million) of the MDRA's capital improvement budget is programmed in the first phase of the redevelopment (Years 1-3). This front-loaded phasing plan is also evidenced in the CERL1 scenario, but because the capital expenditures are much less to begin with, the level of risk is dramatically curtailed.

Conclusions

The level of investment and scope of redevelopment planned for DDMT is substantial, totaling over \$42.6 million, according to MDRA estimates. The CERL1 scenario programs only \$36.0 million in capital investment, improving the prospects for risk management and financial feasibility through independently supportable assumptions that create a net positive impact on 15-yr cash flows. However, the financing plan described in the EDC Application does not take advantage of revenue streams throughout the life of the redevelopment, and is financed entirely through debt. A more aggressive strategy will reduce the MDRA's reliance on debt financing, and therefore its level of risk. Thus, this level of investment described in the CERL1 scenario should be looked upon favorably by the Army in negotiating the final terms and conditions of the transfer agreement.

7 Local and Regional Real Estate Market Conditions

Prepared by:

Shawn R. Hill, Community Planner

Jonathan D. Trucano, Community Planner

CERL, ATTN: CN-B

P. O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511

Methodology

In attempting to provide an overall perspective of the development environment in the Memphis Metropolitan Region, CERL gathered general demographic and employment data for the region from a variety of sources. To comprehensively assess the market analysis provided within the DDMT EDC Application and Reuse Plan, CERL analyzed local and regional residential, office, and industrial real estate market data. Real estate market data were collected from real estate research firms, The Memphis Chamber of Commerce, government studies conducted in conjunction with BRAC initiatives, interviews with local real estate brokers, as well as other referenced sources. The independently gathered data were used, in part, to confirm or dispute claims made in the EDC Application and Reuse Plan related to real estate conditions, impacts due to base closure, and anticipated economic redevelopment from an EDC.

Background

As part of the process of evaluating the Memphis Metropolitan Region and local submarkets, CERL examined the area surrounding the EDC parcel, the location and characteristics of the regional submarket relevant to DDMT, and recent regional economic and demographic trends.

Site Configuration

The former DDMT site consists of 642 acres located in the south-central part of Memphis in Shelby County, TN. Specifically, the installation is approximately 4 miles southeast of the Memphis central business district and 1 mile north of Memphis International Airport.

At the time of the BRAC 95 recommendation, the Depot had 189 structures, warehouses, and other support outbuildings; 26 miles of railroad tracks; and 28 miles of roadway.* The installation is divided into two sections — the main installation (574 acres) and Dunn Field (68 acres). The main installation is highly developed, containing the majority of buildings, parking lots, and material storage yards for the facility. In addition, it features administrative offices and residential units, as well as fire protection, security, and recreational facilities. The entire main installation is highly secure behind gates and fencing. Alternatively, Dunn Field is primarily an undeveloped, open, unpaved area, which lies north of the northwest quadrant of the main installation area; Dunn Avenue separates Dunn Field from the main installation area. The Dunn Field site was primarily used for landfilling and as a national stockpile for fluorspar and bauxite; the U.S. Environmental Protection Agency (EPA) currently designates it as a national priority listing (NPL).

Access

Memphis is the focal point of a vast network of national highways, railways, airways, and waterways, thereby earning its nickname as "Distribution Center of the United States." Hence, the DDMT site has extensive access to population and commercial centers in the city, the surrounding region, and the nation as a whole. Specifically, Memphis is within 50 miles of the geographic population center of the United States; moreover, 65 percent of the U.S. population residing in 152 major metropolitan markets can be reached by truck overnight. In addition, the Port of Memphis is the second largest inland port on the Mississippi River and the fourth largest inland port in the nation. Finally, the Memphis International Airport handles more cargo than any other airport in the world.

* Taken from U.S. Army FEA.

Regionally, the DDMT site offers proximate access to major highways, which include Interstates 40 and 55, and U.S. Highways 51, 61, 64, 70, 72, and 78. In addition, Interstate 240, a local bypass that connects I-40 to I-55, provides access to state highways 1, 3, 4, 14, 23, and 57. Locally, the main installation is bordered by Airways Boulevard on the east, Perry Road on the west, Ball Road to the south, and Dunn Avenue to the north. Airways Boulevard, a six-lane arterial highway, is the most heavily traveled road in the immediate vicinity of DDMT; the main entrance for the site is from Airways through Gate One. Airways Boulevard offers immediate access from DDMT to I-240, which is less than 1 mile south of the site.

In addition to convenient street access, Memphis Area Transit Authority (MATA) bus routes service the DDMT site. Specifically, Route 32, a MATA-designated crosstown unit, runs north-south along Airways Boulevard and directly past the DDMT site. Bus stops in the immediate vicinity are located in front of the DDMT main entrance, and at the intersection of Airways Boulevard and Dunn Avenue. Bus service is available from 6:00 a.m. until approximately 6:15 p.m.

Six major national railroad systems operate in the Memphis Metropolitan Region including the Union Pacific System, CSX Corporation, Norfolk Southern, Southern Pacific, Illinois Central Gulf, and Burlington Northern. It is estimated that 96 freight trains travel in and out of Memphis daily. Commercial rail carrier service for the DDMT site is provided by Burlington Northern. In addition, passenger rail service to Memphis is available as provided by Amtrak.

Finally, although the installation property itself has no runways, the Memphis International Airport, which is the major passenger and cargo airport in the region, is located just 1 mile from the site. In addition, six other air facilities, which offer a variety of air services to the Memphis area, are located within 12 miles of the DDMT site.

Contiguous Land Uses

Most of the area surrounding DDMT is highly developed and can be characterized by a variety of land uses, including light and heavy industrial, commercial, and residential. DDMT lies in the Depot District, a predominately industrial corridor that occupies 7,100 acres. The Depot District is the smallest

of the 20 planning districts designated by the Memphis and Shelby County Office of Planning and Development.*

Most of the development in the Depot District was begun before the widespread use of zoning regulations; consequently, many residential areas are located immediately adjacent to existing industries and businesses.† Several blighted residential neighborhoods are within the immediate vicinity of DDMT; housing in the Depot District includes single-family homes, duplexes, as well as four mobile home parks. In addition, four open-space areas used for recreation, several cemeteries, and some small community churches are in the immediate vicinity of the DDMT site.

Market Analysis

In attempting to provide a general analysis of the Memphis regional market, CERL proceeded to examine the state of the local commercial real estate market. The reuse of the DDMT facility is largely focused on warehouse/distribution and light manufacturing industrial uses. Accordingly, particular emphasis was placed on these market segments.

General State of the Regional Real Estate Market

Driven by low inflation and interest rates, the real estate market in the Memphis Metropolitan Region is exceptionally tight and analysts are projecting another strong year. Healthy sales and leasing activity, continuing positive absorption, and low vacancy rates all evidence the overall strength of the commercial market. Spurred by the insatiable demand for investment properties by Real Estate Investment Trusts (REITs) and pension funds, the aggregate demand for industrial investment real estate in the Memphis area approached record levels in 1997.

* Final EA for DDMT, pp 4-6.

† Ibid, pp 4-8.

Industrial Market Summary

Driven by the strength of the regional economy, its locational advantage for distribution, and the widespread availability of investment capital to support new development, the industrial market in the Memphis Metropolitan Region is continuing to experience sustained growth. Despite the millions of square feet of newly constructed industrial facilities that have flooded the market in recent years, net absorption of industrial space remains positive.* The rapid development of industrial property is expected to continue in the near future as REITs, pension funds, and other sources of capital continue to identify attractive development and investment opportunities in this thriving market. Table 7.1 summarizes industrial market trends during the period covering 1993 to 1996.

In general, the industrial market in Memphis is dominated by facilities used for warehousing and distribution; however, the presence and contributions of a stable manufacturing sector should not be overlooked. Specifically, in terms of market segmentation, warehouse/distribution space accounts for roughly 75 percent of all industrial inventory on the market, while manufacturing uses comprise the remaining 25 percent; surprisingly, virtually none of the space is used for high technology research and development. With respect to absorption, of all industrial space absorbed in 1997, manufacturing uses represent slightly more than 4.0 percent of total industrial absorption. Although similar trends are expected throughout the next several years, market sources have indicated recent increasing demand and interest for manufacturing space. This demand is primarily being derived to complement the obvious strength of the industrial distribution sector of the regional economy.

It is important to note, however, that consideration of absorption figures in percentage terms can be deceiving, mainly attributable to the sheer volume and robustness of the current market demand for warehouse/distribution space. In looking at a disaggregation of major industrial relocation and expansion projects in the Memphis area since 1995, the contributions of the manufacturing sector become far more apparent. Specifically, in each year since 1995, manufacturers have, on average, occupied roughly 1.1 million SF of total space, created almost 900 jobs, and invested over \$200 million in capital. Table 7.2 summarizes these trends.

* Obtained from 1998 *Memphis Industrial Market Overview*, CB Commercial – Memphis, p 1.

Table 7.1. Selected real estate market trends for the Memphis Metropolitan Region.

	YEAR		
	1995	1996	1997
Total Market Size (SF)*	105,700,000	111,600,000	119,800,000
New Construction (SF)*	5,469,300	5,900,000	4,500,000
Total Leasing Activity*	NA	6,600,000	8,100,000
Vacancy Rate (%)*	12.2	12.1	12.8
Net Absorption (SF)*	5,810,000	5,435,000	5,490,000
Average Rental Rates (\$ per SF)**	\$3.02	\$2.88	\$3.08
* Source: Wilkinson & Snowden Year End Industrial Market Overviews for 1996 & 1997.			
** Source: Memphis Chamber of Commerce.			

Table 7.2. Summary of major new and expanded industrial project averages: 1995 - 1998 YTD.

Project Type	Jobs Created		Square Feet Occupied		Capital Investment	
	Avg	Avg %	Avg	Avg %	Avg	Avg %
Manufacturing/Assembly	868	16	1,114,548	19	\$209,603,078	34
Distribution/Warehousing	2,662	52	4,556,808	66	\$204,040,999	31
Other*	1,850	32	1,033,637	14	\$257,611,158	35
Total	5,380	100	6,704,993	100	\$671,255,234	100
Source: Memphis Chamber of Commerce, Summary of Major New and Expanded Projects.						
* Includes office, flex, headquarters, service, and telecommunications.						

The DDMT site offers a unique location within the Downtown/Midtown submarket given its proximity to the larger Airport/Southeast submarket to the south. The Airport/Southeast submarket is the region's largest and most active, featuring more than 55.1 million SF of industrial space, much of which has been newly developed. Although the DDMT site is actually considered a part of the smaller Downtown/Midtown submarket, its unique location offers better access to the I-240 corridor and Memphis International Airport, both of which are in the Airport/Southeast submarket. Figure 7.1 illustrates the two submarkets in relation to the DDMT site and surrounding region.

Industrial transactions occurring in 1997 were dominated mainly by Memphis area companies seeking expansion opportunities.* Given that demand for industrial facilities is clearly evident, CERL feels confident that the market for second-generation space with obvious reuse potential is strong; moreover, redevelopment opportunities at the DDMT site can be competitively marketed in both submarkets. Hence, although DDMT faces substantial competition from the larger and more active southeast submarket, given the current strength of

* Refer to Memphis area Chamber of Commerce *Major New and Expanded Projects* report for 1997.

the regional industrial market, as well as DDMT's comparative advantage for lower cost reuse, CERL supports the applicant's finding that DDMT can successfully compete for a share of the local industrial tenants seeking existing facilities with reuse potential.

Office Market Summary

Although the MDRA's preferred reuse scenario does not specifically designate office uses as part of its EDC business plan, CERL's market research indicates that 3 to 5 percent of recently developed industrial space is typically reserved for office build out.* Accordingly, the following office market data have been provided to complement and support these typical market and industry trends.

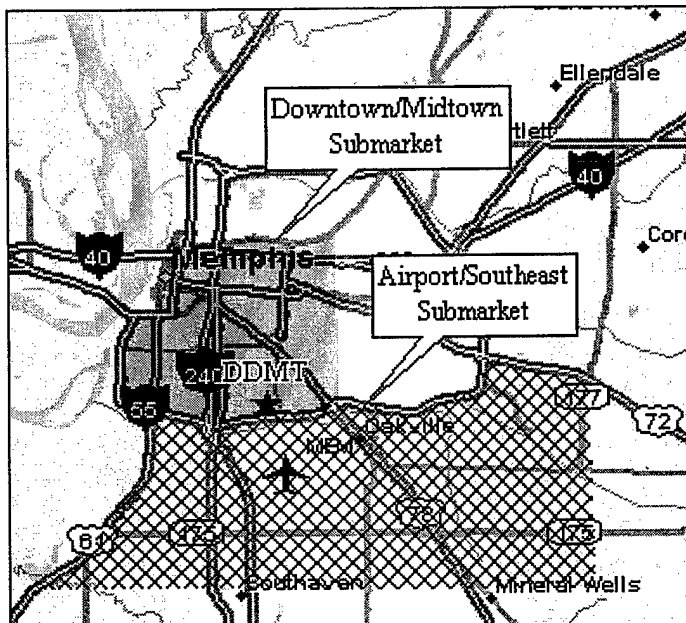


Figure 7.1. Spatial relationship and delineation of relevant industrial submarkets to DDMT and Memphis International Airport.

* As indicated in the Memphis Industrial Market Overview provided to CERL by Jim Mercer of CB Richard Ellis - Memphis Office.

The Memphis Metropolitan Region office market has witnessed positive growth throughout the last several years, a trend that is expected to continue. The strength and tightness of this market is evidenced by increases in inventory, occupancy, and rental rates, spurred by positive net absorption. More specifically, for year-end 1997, the overall occupancy rate for the Memphis metropolitan office market was 87.98 percent, up 0.62 percentage points from the previous year, and the overall weighted average rental rate for the metro area rose to \$14.82, an increase of \$0.60 over the 1996 year-end rate of \$14.22.*

Given the age and condition of DDMT facilities, any future office uses onsite would likely compete with existing Class B and Class C facilities in the surrounding submarkets. CERL's market analysis identified several trends indicative of health and stability in the market for these specific uses. Foremost, rental rates for Class B and C office space continued to rise in 1997. Class B rates increased \$0.41, to \$12.58/SF; moreover, Class C space showed the largest gains of any class, rising \$0.58, to \$9.29/SF. In addition, while Class A space demonstrated negative absorption of 154,498 SF, Class B and C space exhibited positive absorption figures of 39,676 SF and 140,969 SF, respectively. Finally, office occupancy rates increased significantly in both the Airport/Southeast and Midtown submarkets in 1997, rising almost five percent in each submarket.† Table 7.3 is an overview of the recent trends for the Memphis MSA office market and relevant submarkets.

Land Market Activity

The MDRA's preferred reuse scenario and EDC Business Plan for the DDMT site includes the programming of 5- to 15-acre parcels of vacant land throughout the 15-yr time horizon. Accordingly, CERL researched the market for industrially zoned vacant land in Memphis, not only to verify the feasibility of the MDRA's plan, but also as a primary indicator of the potential likelihood of future development in the metropolitan market.

* SIOR Office Market Overview, Executive Summary, provided by CB Commercial/Interstate Realty Corporation -- Memphis.

† According to the SIOR Office Market Survey, the southeast submarket had the largest increase in occupancy, rising 4.84 percentage points to 89.32 percent. The second highest increase was seen in the Midtown submarket, which reported 88.06 percent, up 4.69 percentage points over the previous year.

Table 7.3. Office market overview - Memphis Metropolitan Region and selected submarkets.

Market	Class	Total SF	SF Occupied	% Occupied Dec 1997	Net Absorp- tion 1 yr	Rental Rates	
						Dec 1997	Dec 1996
Midtown	A	364,319	333,329	92.87	23,830	\$14.82	\$14.82
	B	846,156	720,131	85.11	16,727	\$12.53	\$12.04
	C	181,933	167,694	92.17	23,569	\$8.92	\$8.56
Southeast	A	-	-	-	-	-	-
	B	655,268	585,306	89.32	31,708	\$10.41	\$10.51
	C	-	-	-	-	-	-
Total Memphis Metropolitan Market	A	9,120,758	8,369,189	91.76	(154,498)	\$17.29	\$16.79
	B	9,622,323	8,131,068	84.50	39,676	\$12.58	\$12.17
	C	680,984	588,320	86.39	140,969	\$9.29	\$8.71

The land market in the Memphis Metropolitan Region has been active throughout recent years as both users and developers continue to buy land. Recent sales that have occurred indicate sales prices on a per acre basis ranging from a low of \$7,500 per acre to a high of \$72,309 per acre (for a graded site with utilities and drainage provisions in place) for parcels ranging anywhere from 19 to 260 acres.* In addition, and perhaps more relevant, CERL was able to identify one particular transaction that involved a comparable property to DDMT; this property exhibited similarities with respect to age, former use, and location. In this 1990 transaction, Roadway Packaging Systems purchased 37.28 acres of vacant, graded, and infrastructure-improved property for \$1,440,000, which translates to roughly \$38,600 per acre.†

Residential Market Summary

The residential housing market in the Memphis Metropolitan Region is exceptionally strong and has exhibited steady growth throughout the past decade. The tightness of this market, which has been bolstered by low interest rates, is evidenced by sustained growth in new construction, continued positive absorption, and high rental and sale prices per square foot and per unit. Driven mainly

* Information obtained from Jim Mercer, CB Richard Ellis, Memphis Industrial Market Overview.

† Information obtained from Dan Wilkinson of Wilkinson and Snowden Inc., Memphis.

by the growth of the regional economy and ensuing sustained population immigration, the current outlook for the residential market remains positive.*

The former DDMT facility is in the Depot District residential submarket. This submarket is characterized by a shortage of quality housing for both rental and owner-occupied, single and multi-family units. Housing stock available in the area is blighted, and existing apartment complexes maintain a low-income designation. Quality housing for residents seeking single or multi-family units is available in nearby Bartlett; however, this market is extremely tight and tenants can expect to pay more than \$800 for a modest three bedroom unit.

Conclusion

In general, CERL confirms the market analysis and findings presented in the MDRA's Reuse Plan and EDC Application. Driven by the strength of the regional economy, the region's comparative advantage as a distribution center, and other contributing factors, the real estate market in the Memphis Metropolitan Region is continuing to experience sustained growth. The DDMT site offers a unique location within the Midtown submarket given its proximity to the Memphis International Airport and larger Airport/Southeast submarket to the southwest. Although DDMT faces substantial competition from alternative development sites, given the current strength of the regional market, as well as DDMT's comparative advantage for lower cost reuse, CERL supports the MDRA's market feasibility findings. In summary, based on CERL's independent third-party review of Memphis industrial real estate market trends, and in consideration of the strengths of the EDC offering in terms of location, reusable buildings, public investment, and tax advantages, CERL concludes that a reasonable level of market demand will likely exist for EDC real estate products over the 15-yr pro forma. Thus, neither the Memphis real estate market nor the DDMT site itself, poses any major foreseeable limitations to the timely redevelopment and job creation opportunities proposed in the Reuse Plan.

* Residential Market information obtained from a phone interview with Karen Carpenter, Residential Specialist with Crye-Lieke Realty Group, Memphis.

8 Army Disposal Plan, Other Federal Agency Concerns, and Other Property Disposal Authorities

As part of the EDC Application review process adopted by the BRAC office at HQUSACE and presented at the Corps of Engineers Real Estate Workshop in Denver, CO, in December 1995, CERL has been asked to defer comment on these issues to the Real Estate Directorate at HQUSACE and the Corps of Engineers District, Mobile, AL. In addition, both the negotiated process leading up to the submittal of the formal EDC Application and review of the legal environment related to real and personal property disposal are beyond the scope of CERL's technical review.

Future EDC reviews will continue to explore these issues insofar as they pertain to other elements of the technical review. Summaries of CERL's findings on these matters will be documented when appropriate and when requested by Army decision-makers.

9 Economic Benefit to the Federal Government

Prepared by:

Jeffrey J. Bogg - Community Planner

Shawn R. Hill - Community Planner

CERL, ATTN: CN-B

P.O. Box 9005

Champaign, IL 61826-9005

(217) 352-6511, x6752

Introduction

One of the criteria for EDC applicant eligibility that may be considered by the military department is the economic benefit to the Federal Government that will be derived from the proposed EDC. The military department is asked to consider the protection and maintenance cost savings that would be avoided by a swift conveyance of the EDC parcel, as well as the anticipated consideration from the transfer. In the EDC Application for the DDMT, the MDRA has valued the EDC parcel at *negative* \$40 million; note, however, that neither an expressed offer of consideration, nor conditions of acceptance, were identified within the EDC Application. The applicant does argue that by rapidly assuming responsibility for the DDMT property, the Army may realize substantial operations and maintenance cost savings. In an attempt to independently evaluate these claims, CERL calculated the one-time layaway costs and annual M&R costs associated with "mothballing" the facilities in the absence of an EDC. Also discussed here is the potential consideration for the property that could be defended in a negotiated arrangement.

Conclusions

Layaway and Annual M&R Cost Savings

Without a timely conveyance of the 495-acre EDC parcel after all Army uses for the property cease, CERL assumed that the Army would be compelled to mothball or "layaway" the facilities and infrastructure at DDMT except for those uses being retained by the Federal Government (i.e., Army Caretaker Force). CERL estimated the cost of this layaway program using guidance spelled out in the U.S. Army Center for Public Works (USACPW) Technical Note 420-10-08 and CERL Technical Report (TR) M-91/23, *Layaway Procedures for Facilities, Volume II: Inspection and Maintenance Repair Checklists*. The cost estimating procedures were supplemented with information CERL gained from conversations with several DDMT facilities engineers and the experience of CERL researchers.

CERL estimated the layaway and annual M&R costs for nearly 5.6 million SF of buildings and supporting infrastructure at DDMT based on three levels of layaway: Levels 1, 2, and 3. Each of these layaway levels corresponds to a decreasing level of care. For example, Layaway Level 1 would be used when the intent is to revive the facility at a later time with as little effort as possible (i.e., to support reuse by an MDRA); whereas Level 3 assumes the building will be more or less abandoned (i.e., an approved reuse plan contemplates demolition or no reuse for the property is obvious). Tables 9.1 and 9.2 provide a range of values for the cost of one-time layaway followed by annual M&R for each of the described layaway levels. An expanded discussion of these one-time layaway costs and annual M&R costs follows.

Layaway Level One.

In this layaway level, buildings are laid away, secured, frequently inspected, repaired, and have most utilities active. The intent of this level of layaway is to reactivate the facility at a later date with as little effort as possible. Buildings are heated at 55 °F in the winter and cooled to 80 °F in the summer.

Table 9.1. One-time layaway cost estimates for the DDMT EDC parcel.

LAYAWAY LEVEL THREE		LAYAWAY LEVEL TWO		LAYAWAY LEVEL ONE	
Total minimum	Total high	Total minimum	Total high	Total minimum	Total high
\$424,958	\$849,916	\$1,115,515	\$1,952,152	\$805,599	\$1,611,987

Table 9.2. Annual M&R cost estimates for the DDMT EDC parcel.

M&R LEVEL THREE		M&R LEVEL TWO		M&R LEVEL ONE	
Total minimum	Total high	Total minimum	Total high	Total minimum	Total high
\$215,805	\$431,610	\$712,156	\$1,246,273	\$1,279,172	\$2,302,510

Annual M&R in the years following the one-time layaway would include a security force patrolling the area, a small interdisciplinary workforce to inspect the infrastructure systems frequently and make necessary repairs, and a regular landscape and maintenance schedule.

Layaway Level Two.

In this level of layaway, buildings are laid away, secured, frequently inspected, repaired, and have most utilities shut off. The intent of this level of layaway is to simply have the facility available for future use. Utilities will be maintained on an "as needed" basis by the security force, inspectors, and caretaker force.

Annual M&R in the years following the one-time layaway would include a security force patrolling the area, a small interdisciplinary caretaker force that would inspect the infrastructure systems annually and make minor repairs, and a regular landscape maintenance schedule.

Layaway Level Three.

This level of layaway is called the "do nothing" level as outlined in CERL TR M-91/23, *Layaway Procedures for US Army Facilities, Volume 1: Decision Criteria and Economics*. Simply put, the installation personnel will "lock the door as they leave the building," abandon the facility, and do no maintenance on the infrastructure. Buildings will have the personal items removed, be cleaned (swept/mopped), and be secured. Utilities will be abandoned or cut in place.

Level Three annual M&R is minimal. However, security for the installation will still be required as will some facilities to house the security force and minor landscape maintenance.

Probable Layaway and M&R Program in the Absence of an EDC

If the EDC is not approved in a timely manner, and the Army is forced to continue its caretaker function at DDMT, it is likely that the Army would be required to maintain the property so as to allow for parcelization and redevelopment of the base in accordance with the Reuse Plan for DDMT.

Therefore, the probable layaway and M&R program for the EDC parcel would likely include layaway and M&R consistent with the requirements of Level One to ensure rapid property transfer through willing buyers. Table 9.3 provides a range of costs for this scenario.

Table 9.3. Potential Army layaway and M&R commitments.

	LAYAWAY LEVEL ONE	
	Total minimum	Total high
EDC Parcel	\$805,599	\$1,611,987
	M&R LEVEL ONE	
	Total minimum	Total high
EDC Parcel	\$1,279,172	\$2,302,510
Total	\$2,084,771	\$3,034,086

Based on the projected costs presented in Table 9.3, the Army could expect to incur at least \$2.0 million in first-year carrying costs for DDMT in the absence of an EDC. Since the MDRA is presumably prepared to assume ownership as soon as soon as possible, the Army should consider an O&M cost avoidance to the extent that a successful conveyance cannot be achieved in a timely manner.

Anticipated Consideration From the EDC

Summary of MDRA Proposal

The MDRA application values the EDC parcel at between *negative* \$19 million and *negative* \$40 million; however, no direct offer of consideration was expressed to the Army for the 495-acre EDC parcel and supporting water, sewer, drainage, gas, electric, communications, and internal roadway systems. A major weakness in the EDC Application was the failure to identify major EDC terms and conditions.

CERL Findings

CERL provided extensive discussion in Chapter 4, **Business Plan Review and Market and Financial Feasibility Analysis**, regarding the analysis of the applicant's business plan and the NPV of the business plan. In summary, CERL concluded that the applicant adequately demonstrated business plan market and financial feasibility. However, CERL's independent investigation led to the development of a scenario that significantly enhances financial feasibility through a set of independently supportable assumptions. CERL calculated the recommended range of business plan value to be *positive* \$3.1 million to \$6.0

million if land sales are not considered. If land sales are included, the calculated range is *positive* \$4.8 million to \$8.0 million, resulting in a total range of business plan value of *positive* \$3.1 million to \$8.0 million.

Level of investment

The MDRA has proposed to underwrite a majority of the costs associated with the redevelopment of DDMT, including \$28 million in operational expenditures and \$42.6 million in infrastructure improvements. These costs are to be offset with real estate revenues and external financing sources, which includes a least one EDA grant, OEA grants, and state and local support from the sale of revenue bonds. The MDRA's anticipated return from investment is the creation of over 4,500 onsite light industrial and related jobs facilitated through a quality, light industrial park. CERL's analysis concluded that the MDRA has a reasonable probability of achieving investment levels and job creation goals, but the business plan is marked by periods of negative cash flows, which will require gap financing and/or grant funding.

Recommendation

Based on the eligibility factors/criteria reviewed for this report, it is the opinion of CERL that the applicant is eligible for an EDC. CERL recommends that the Army consider up to \$3.1 million in facility layaway and annual M&R costs when negotiating the final terms and conditions of the conveyance. It is also the recommendation of CERL that the Army look favorably upon the MDRA's level of investment, which will likely create over 4,500 jobs when deciding if a discount from FMV is warranted. Finally, the CERL estimated range of business plan value is *positive* \$3.1–\$8.0 million, which contrasts markedly with the MDRA's estimated market value range of *negative* \$20–\$40 million. However, the Army's final determination of value and possible consideration must rest largely on the results of a negotiation process between the Army and the MDRA, as well as the results of the Corps of Engineers' FMV appraisal process.

10 Review of Application for Completeness

This chapter summarizes CERL's review of the MDRA's EDC Application for completeness as required by 32 CFR Part 91.7(e)(5). The required contents are listed below in italics, followed by CERL's findings.

1. *Copy of the adopted Reuse Plan.* A copy of the plan is included.
2. *Project narrative, including:*
 - a. *General description of the property requested.* A description is provided in the application, but was found to be somewhat fragmented. The Redevelopment Plan provides an indepth inventory of all facilities; however, no indication is given as to which properties fall within the bounds of the EDC. Conversely, the EDC Application provides transfer and land-use plans, but apparently did not provide corresponding EDC acreage by land use. Several conveyance and land-use changes were made since the formal adoption of the Redevelopment Plan, thus complicating CERL's efforts to reconcile EDC acreage and facilities by land use.
 - b. *Description of intended uses.* A description of three main alternatives, as well as the ultimate recommended alternative is provided, and the pros and cons of each alternative are elaborated in great detail. A thorough description of the types of land uses and the percentage of square footage dedicated to each use are provided; however, estimates of land-use breakdown by acreage would have been more useful to CERL's analysis.
 - c. *Description of the economic impact of the closure on local communities.* A minimally acceptable description is provided. Although closure impacts were quantified, underlying assumptions were not available for review. In addition, the EDC Application attempted to compare the employment and output impacts using data from 1991. Although these statistics might prove insightful in evaluating the long-term conditions of DDMT, the statistics are not appropriate units of comparison given the timeline of the BRAC decision.

- d. *Description of the financial condition of the community.* A narrative is provided, highlighting population, income, and employment trends within the Depot District in relation to the City of Memphis and the Memphis MSA. While this information provides insight regarding the economic conditions of the community surrounding the Depot and its blighted nature, it does not illustrate the financial status of the city, nor its ability to loan or borrow money. Such information illustrates the city's ability or willingness to invest in redevelopment possibilities for the DDMT site. A copy of the annual financial report, giving revenue, expenditure, bond rating, and other pertinent data for the City of Memphis would greatly assist CERL's technical review.
- e. *Statement of how the EDC is consistent with the overall Redevelopment Plan.* The application provides a short excerpt of the goals and objectives of the adopted Redevelopment Plan, but gives few specifics on how these goals and objectives are met in the EDC Application.

3. *Description of how the EDC will contribute to short- and long-term job creation and economic redevelopment.*

A minimally acceptable description of the 5-yr and 15-yr job creation potential of the redevelopment is provided, as are short-term construction employment projections. It is not made clear whether these job generation estimates are for the entire redevelopment plan area or only for the EDC parcels. This oversight coupled with the fact that no sources are cited for these estimates necessarily requires the independent development of a set of defensible assumptions, which greatly expands CERL's third-party review role.

4. Business and development plan for the EDC parcel, including:
- a. *Development plan, timetable, phasing plan, and cash flow analysis*
 - b. *Market and financial feasibility analysis*
 - c. *Cost estimate or justification for infrastructure and other investments needed for development of the EDC parcel*
 - d. *Local investment and proposed financing strategies for the development.*

4a was included, but lacked clarity and consistency in terms of the relationship between real estate market drivers and programmed infrastructure improvements. For example, transportation infrastructure was programmed for the west side of the EDC parcel, although no mention is made of improved land sales within the 15-yr pro forma horizon, thus calling into question the purpose and timing of such an investment. 4b was included, but was found to be wholly

unsupported, and the assumptions and conclusions arrived at are indefensible by virtue of a *negative* \$19.7 million indicated business plan value. Although infrastructure project listings and costs were included for compliance under 4c, they generally lacked a substantive technical treatment in terms of appropriate quantity take-offs, cost estimating methodology, and job creation need. 4d was adequately discussed and appropriate, but could have benefited from additional discussions of municipal bond ratings and community willingness to invest in DDMT.

5. *Statement describing why other authorities—such as negotiated or public sale—cannot be used to accomplish economic development and job-creation goals.*

A direct statement to this effect is not provided, and needs to be addressed.

6. *If a transfer is requested for less than fair market value...then a statement should be provided justifying a discount.*

The applicant argues that the FMV of the EDC parcel is (\$40,893,729), based on the *negative* net present value of the business plan.

7. *Statement of the LRA's legal authority to acquire and dispose of the property.*

A statement of legal authority is provided.

Appendix A: Caveats, Assumptions, and Employment Multipliers by Standard Industrial Classification Code

Caveats Used in Conducting the Analysis

It should be noted that CERL's analysis and methodology is also subject to several limitations that may distort findings or limit their applicability. These limitations are as follows:

- This analysis is based on static modeling techniques that cannot capture dynamic economic effects that may manifest over a longer period of time, such as 5 to 10 years
- Since this methodology does not capture underemployment effects and equates all jobs equally, it does not fully reflect the possibility that former employees will be able to find new employment, but only at a lower compensation level.

It should also be noted that CERL's analysis relied on the smaller ROI used by the Final Environmental Assessment for DDMT—which includes only Shelby County—instead of the area used for the study in the EDC Application, which includes the entire Memphis MSA. CERL accepts the Army FEA assessment, given that approximately 93 percent of DDMT employees reside within Shelby County.* While CERL has determined that this smaller region better represents the economic activities occurring in the area, the selection of a smaller ROI also concentrates the calculated impacts into a smaller area, which may slightly overstate local impacts.

* Final Environmental Assessment for BRAC 95 Disposal and Reuse of Defense Distribution Depot Memphis, Tennessee; pp 4-50.

Chapter 2 Assumptions

Typical 20*

Korean*

110,000 sq ft each

4 @ 201,000 sq ft

1 bay = 22,000 sq ft (110,000/5)

1 @ 470,000

Manufacturing

Distribution

EDR = 1000

EDR = 1500

Emp Mult = 2.469

Emp Mult = 2.267

Future Light Ind on Vacant Parcels†

10 acres per yr developed beginning in 2000 for 10 years

0.5 Floor Area Ratio (FAR)

Emp Mult and Emp Density Ratios Calculated as average of Manufacturing and Distribution uses

Specifically, EDR = 1250, Emp Mult = 2.368

* Building square footages taken from Section IV, p 9-13 and are as noted above.

† Absorption schedule follows preferred reuse plan outlined in EDC Application.

Employment Multipliers by Standard Industrial Classification (SIC) Code

SIC	Industry	Type I Multiplier*	Type II Multiplier**
1	Dairy Farm Products	1.33	1.531043
2	Poultry and Eggs	0.00	.000000
3	Ranch Fed Cattle	1.14	1.211156
4	Range Fed Cattle	1.13	1.191004
5	Cattle Feedlots	0.00	.000000
6	Sheep, Lambs and Goats	1.04	1.054594
7	Hogs, Pigs and Swine	1.28	1.411887
8	Other Meat Animal Products	0.00	.000000
9	Miscellaneous Livestock	1.08	1.113808
10	Cotton	1.45	1.722131
11	Food Grains	1.15	1.232373
12	Feed Grains	1.22	1.353021
13	Hay and Pasture	1.08	1.118454
14	Grass Seeds	0.00	.000000
15	Tobacco	0.00	.000000
16	Fruits	1.23	1.343197
17	Tree Nuts	0.00	.000000
18	Vegetables	1.42	1.633540
19	Sugar Crops	0.00	.000000
20	Miscellaneous Crops	0.00	.000000
21	Oil Bearing Crops	1.17	1.285420
22	Forest Products	1.35	1.480375
23	Greenhouse and Nursery Products	1.32	1.464393
24	Forestry Products	1.90	2.198590
25	Commercial Fishing	0.00	.000000
26	Agricultural, Forestry, Fishery Services	1.04	1.271315
27	Landscape and Horticultural Services	1.01	1.205655
28	Iron Ores	0.00	.000000
29	Copper Ores	0.00	.000000
30	Lead and Zinc Ores	0.00	.000000
31	Gold Ores	0.00	.000000
32	Silver Ores	0.00	.000000
33	Ferroalloy Ores, Except Vanadium	0.00	.000000
34	Metal Mining Services	0.00	.000000
35	Uranium-radium-vanadium Ores	0.00	.000000
36	Metal Ores, Not Elsewhere Classified	0.00	.000000
37	Coal Mining	1.61	3.050257
38	Natural Gas & Crude Petroleum	0.00	.000000
39	Natural Gas Liquids	0.00	.000000
40	Dimension Stone	0.00	.000000
41	Sand and Gravel	1.22	1.973179
42	Clay, Ceramic, Refractory Minerals, N.E.C.	0.00	.000000
43	Potash, Soda, and Borate Minerals	0.00	.000000
44	Phosphate Rock	0.00	.000000
45	Chemical, Fertilizer Mineral Mining, N.E.C.	0.00	.000000

SIC	Industry	Type I Multiplier*	Type II Multiplier**
46	Nonmetallic Minerals (Except Fuels) Service	0.00	.000000
47	Misc. Nonmetallic Minerals, N.E.C.	0.00	.000000
48	New Residential Structures	1.41	1.802730
49	New Industrial and Commercial Buildings	1.42	1.957530
50	New Utility Structures	1.34	1.858588
51	New Highways and Streets	1.40	1.928437
52	New Farm Structures	0.00	.000000
53	New Mineral Extraction Facilities	1.04	1.420904
54	New Government Facilities	1.47	2.168171
55	Maintenance and Repair, Residential	1.41	1.876165
56	Maintenance and Repair Other Facilities	1.22	1.684021
57	Maintenance and Repair Oil and Gas Wells	1.01	1.110883
58	Meat Packing Plants	1.71	2.717456
59	Sausages and Other Prepared Meats	1.56	2.277012
60	Poultry Processing	1.19	1.814005
61	Creamery Butter	0.00	.000000
62	Cheese, Natural and Processed	1.88	2.617766
63	Condensed and Evaporated Milk	2.09	3.018205
64	Ice Cream and Frozen Desserts	2.04	2.832861
65	Fluid Milk	1.87	2.688030
66	Canned Specialties	2.25	3.083790
67	Canned Fruits and Vegetables	1.75	2.470962
68	Dehydrated Food Products	1.53	2.208671
69	Pickles, Sauces, and Salad Dressings	0.00	.000000
70	Frozen Fruits, Juices and Vegetables	0.00	.000000
71	Frozen Specialties	1.58	2.315721
72	Flour and Other Grain Mill Products	2.85	4.550663
73	Cereal Preparations	4.87	7.332445
74	Rice Milling	0.00	.000000
75	Blended and Prepared Flour	2.55	3.725304
76	Wet Corn Milling	0.00	.000000
77	Dog, Cat, and Other Pet Food	2.98	4.282654
78	Prepared Feeds, N.E.C	2.79	4.223279
79	Bread, Cake, and Related Products	1.46	2.101768
80	Cookies and Crackers	0.00	.000000
81	Sugar	0.00	.000000
82	Confectionery Products	0.00	.000000
83	Chocolate and Cocoa Products	0.00	.000000
84	Chewing Gum	1.36	1.887582
85	Salted and Roasted Nuts & Seeds	0.00	.000000
86	Cottonseed Oil Mills	2.29	3.301576
87	Soybean Oil Mills	9.10	12.155501
88	Vegetable Oil Mills, N.E.C	0.00	.000000
89	Animal and Marine Fats and Oils	1.90	2.604657
90	Shortening and Cooking Oils	3.59	5.354364
91	Malt Beverages	1.84	2.747087

SIC	Industry	Type I Multiplier*	Type II Multiplier**
92	Malt	0.00	.000000
93	Wines, Brandy, and Brandy Spirits	0.00	.000000
94	Distilled Liquor, Except Brandy	0.00	.000000
95	Bottled and Canned Soft Drinks & Water	2.17	3.067540
96	Flavoring Extracts and Syrups, N.E.C.	0.00	.000000
97	Canned and Cured Sea Foods	0.00	.000000
98	Prepared Fresh Or Frozen Fish Or Seafood	0.00	.000000
99	Roasted Coffee	0.00	.000000
100	Potato Chips & Similar Snacks	1.80	2.411297
101	Manufactured Ice	1.18	1.567562
102	Macaroni and Spaghetti	2.03	2.862480
103	Food Preparations, N.E.C	1.72	2.324886
104	Cigarettes	0.00	.000000
105	Cigars	0.00	.000000
106	Chewing and Smoking Tobacco	3.90	6.006594
107	Tobacco Stemming and Redrying	0.00	.000000
108	Broadwoven Fabric Mills and Finishing	1.30	1.710501
109	Narrow Fabric Mills	0.00	.000000
110	Womens Hosiery, Except Socks	0.00	.000000
111	Hosiery, N.E.C	0.00	.000000
112	Knit Outerwear Mills	1.19	1.541276
113	Knit Underwear Mills	0.00	.000000
114	Knit Fabric Mills	0.00	.000000
115	Knitting Mills, N.E.C.	0.00	.000000
116	Yarn Mills and Finishing Of Textiles, N.E.C.	0.00	.000000
117	Carpets and Rugs	1.43	1.911301
118	Thread Mills	0.00	.000000
119	Coated Fabrics, Not Rubberized	0.00	.000000
120	Tire Cord and Fabric	0.00	.000000
121	Nonwoven Fabrics	0.00	.000000
122	Cordage and Twine	1.42	2.019613
123	Textile Goods, N.E.C	1.69	2.403870
124	Apparel Made From Purchased Materials	1.23	1.581039
125	Curtains and Draperies	1.15	1.473078
126	Housefurnishings, N.E.C	1.24	1.508566
127	Textile Bags	1.16	1.557546
128	Canvas Products	1.13	1.407646
129	Pleating and Stitching	1.01	1.125161
130	Automotive and Apparel Trimmings	1.31	1.686050
131	Schiffi Machine Embroideries	0.00	.000000
132	Fabricated Textile Products, N.E.C.	1.37	1.722017
133	Logging Camps and Logging Contractors	0.00	.000000
134	Sawmills and Planing Mills, General	1.37	1.844296
135	Hardwood Dimension and Flooring Mills	1.20	1.720295
136	Special Product Sawmills, N.E.C	0.00	.000000

SIC	Industry	Type I Multiplier*	Type II Multiplier**
137	Millwork	1.27	1.660774
138	Wood Kitchen Cabinets	1.20	1.579862
139	Veneer and Plywood	1.36	1.838451
140	Structural Wood Members, N.E.C	0.00	.000000
141	Wood Containers	1.19	1.595455
142	Wood Pallets and Skids	1.20	1.510598
143	Mobile Homes	0.00	.000000
144	Prefabricated Wood Buildings	1.52	2.332703
145	Wood Preserving	0.00	.000000
146	Reconstituted Wood Products	0.00	.000000
147	Wood Products, N.E.C	1.21	1.676263
148	Wood Household Furniture	1.29	1.679642
149	Upholstered Household Furniture	1.26	1.580037
150	Metal Household Furniture	1.26	1.631094
151	Mattresses and Bedspings	1.33	1.907644
152	Wood TV and Radio Cabinets	1.24	1.587185
153	Household Furniture, N.E.C	0.00	.000000
154	Wood Office Furniture	1.27	1.724924
155	Metal Office Furniture	1.90	2.562420
156	Public Building Furniture	1.49	2.021019
157	Wood Partitions and Fixtures	1.21	1.663405
158	Metal Partitions and Fixtures	1.36	1.927895
159	Blinds, Shades, and Drapery Hardware	1.31	1.791138
160	Furniture and Fixtures, N.E.C	1.58	2.441920
161	Pulp Mills	2.99	4.507133
162	Paper Mills, Except Building Paper	1.96	3.048250
163	Paperboard Mills	0.00	.000000
164	Paperboard Containers and Boxes	1.51	2.243613
165	Paper Coated & Laminated Packaging	1.52	2.358615
166	Paper Coated & Laminated N.E.C.	0.00	.000000
167	Bags, Plastic	0.00	.000000
168	Bags, Paper	1.63	2.406988
169	Die-cut Paper and Board	1.45	2.024531
170	Sanitary Paper Products	2.86	4.368178
171	Envelopes	1.42	2.075617
172	Stationery Products	0.00	.000000
173	Converted Paper Products, N.E.C	1.51	2.129415
174	Newspapers	1.22	1.659871
175	Periodicals	1.57	2.261515
176	Book Publishing	1.73	2.352289
177	Book Printing	1.40	1.918572
178	Miscellaneous Publishing	1.36	1.808475
179	Commercial Printing	1.29	1.876533
180	Manifold Business Forms	1.45	2.018100
181	Greeting Card Publishing	0.00	.000000
182	Blankbooks and Looseleaf Binder	1.36	1.839297
183	Bookbinding & Related	1.09	1.406399

SIC	Industry	Type I Multiplier*	Type II Multiplier**
184	Typesetting	1.18	1.769261
185	Plate Making	1.21	2.032017
186	Alkalies & Chlorine	0.00	.000000
187	Industrial Gases	1.17	1.864740
188	Inorganic Pigments	0.00	.000000
189	Inorganic Chemicals Nec.	1.59	2.584609
190	Cyclic Crudes, Interm. & Indus. Organic Chem.	2.82	4.428836
191	Plastics Materials and Resins	3.31	5.001154
192	Synthetic Rubber	2.66	3.980076
193	Cellulosic Man-made Fibers	0.00	.000000
194	Organic Fibers, Noncellulosic	1.91	2.944350
195	Drugs	1.75	2.554873
196	Soap and Other Detergents	1.93	2.828314
197	Polishes and Sanitation Goods	1.42	2.089655
198	Surface Active Agents	0.00	.000000
199	Toilet Preparations	1.80	2.474393
200	Paints and Allied Products	2.11	3.139139
201	Gum and Wood Chemicals	0.00	.000000
202	Nitrogenous and Phosphatic Fertilizers	3.16	5.199128
203	Fertilizers, Mixing Only	1.94	3.013476
204	Agricultural Chemicals, N.E.C	2.30	3.697398
205	Adhesives and Sealants	1.93	3.229308
206	Explosives	0.00	.000000
207	Printing Ink	1.71	2.570076
208	Carbon Black	0.00	.000000
209	Chemical Preparations, N.E.C	2.01	2.764681
210	Petroleum Refining	2.35	3.736740
211	Paving Mixtures and Blocks	1.85	2.771435
212	Asphalt Felts and Coatings	1.83	2.864417
213	Lubricating Oils and Greases	2.67	4.336734
214	Petroleum and Coal Products, N.E.C.	0.00	.000000
215	Tires and Inner Tubes	0.00	.000000
216	Rubber and Plastics Footwear	0.00	.000000
217	Rubber and Plastics Hose and Belting	0.00	.000000
218	Gaskets, Packing and Sealing Devices	0.00	.000000
219	Fabricated Rubber Products, N.E.C.	1.50	2.313783
220	Miscellaneous Plastics Products	1.72	2.442703
221	Leather Tanning and Finishing	0.00	.000000
222	Footwear Cut Stock	0.00	.000000
223	House Slippers	0.00	.000000
224	Shoes, Except Rubber	0.00	.000000
225	Leather Gloves and Mittens	0.00	.000000
226	Luggage	0.00	.000000
227	Womens Handbags and Purses	0.00	.000000
228	Personal Leather Goods	0.00	.000000
229	Leather Goods, N.E.C	0.00	.000000
230	Glass and Glass Products, Exc	1.41	2.022510

SIC	Industry	Type I Multiplier*	Type II Multiplier**
	Containers		
231	Glass Containers	1.53	2.413652
232	Cement, Hydraulic	2.21	3.751746
233	Brick and Structural Clay Tile	0.00	.000000
234	Ceramic Wall and Floor Tile	0.00	.000000
235	Clay Refractories	0.00	.000000
236	Structural Clay Products, N.E.C.	1.09	1.839738
237	Vitreous Plumbing Fixtures	0.00	.000000
238	Vitreous China Food Utensils	0.00	.000000
239	Fine Earthenware Food Utensils	1.82	2.336387
240	Porcelain Electrical Supplies	0.00	.000000
241	Pottery Products, N.E.C.	1.13	1.343687
242	Concrete Block and Brick	1.53	2.055297
243	Concrete Products, N.E.C.	1.33	1.849719
244	Ready-mixed Concrete	1.51	2.342093
245	Lime	0.00	.000000
246	Gypsum Products	0.00	.000000
247	Cut Stone and Stone Products	1.23	1.704947
248	Abrasive Products	0.00	.000000
249	Asbestos Products	1.09	1.500895
250	Minerals, Ground Or Treated	1.70	2.431073
251	Mineral Wool	1.44	1.943719
252	Nonclay Refractories	0.00	.000000
253	Nonmetallic Mineral Products, N.E.C.	1.29	1.790012
254	Blast Furnaces and Steel Mills	2.12	3.056344
255	Electrometallurgical Products	0.00	.000000
256	Steel Wire and Related Products	1.82	2.625528
257	Cold Finishing Of Steel Shapes	2.18	3.156445
258	Steel Pipe and Tubes	0.00	.000000
259	Iron and Steel Foundries	1.35	1.832163
260	Primary Copper	0.00	.000000
261	Primary Aluminum	0.00	.000000
262	Primary Nonferrous Metals, N.E.C.	1.42	2.291795
263	Secondary Nonferrous Metals	3.85	5.465167
264	Copper Rolling and Drawing	0.00	.000000
265	Aluminum Rolling and Drawing	0.00	.000000
266	Nonferrous Rolling and Drawing, N.E.C.	0.00	.000000
267	Nonferrous Wire Drawing and Insulating	1.59	2.236776
268	Aluminum Foundries	1.26	1.689023
269	Brass, Bronze, and Copper Foundries	0.00	.000000
270	Nonferrous Castings, N.E.C.	0.00	.000000
271	Metal Heat Treating	1.48	2.085833
272	Primary Metal Products, N.E.C.	2.09	2.902233
273	Metal Cans	1.78	2.557407
274	Metal Barrels, Drums and Pails	1.40	1.774657
275	Cutlery	0.00	.000000
276	Hand and Edge Tools, N.E.C.	1.24	1.640435

SIC	Industry	Type I Multiplier*	Type II Multiplier**
277	Hand Saws and Saw Blades	0.00	.000000
278	Hardware, N.E.C.	1.35	1.828087
279	Metal Sanitary Ware	1.03	1.435536
280	Plumbing Fixture Fittings and Trim	0.00	.000000
281	Heating Equipment, Except Electric	0.00	.000000
282	Fabricated Structural Metal	1.42	2.009433
283	Metal Doors, Sash, and Trim	1.22	1.678560
284	Fabricated Plate Work (Boiler Shops)	1.19	1.743912
285	Sheet Metal Work	1.29	1.830687
286	Architectural Metal Work	1.20	1.843329
287	Prefabricated Metal Buildings	1.49	2.213753
288	Miscellaneous Metal Work	2.01	2.750819
289	Screw Machine Products and Bolts, Etc.	1.26	1.696141
290	Iron and Steel Forgings	1.25	1.723381
291	Nonferrous Forgings	1.64	8.013604
292	Automotive Stampings	1.54	1.822823
293	Crowns and Closures	0.00	.000000
294	Metal Stampings, N.E.C.	1.39	2.026173
295	Plating and Polishing	1.13	1.637535
296	Metal Coating and Allied Services	1.36	1.748824
297	Small Arms Ammunition	1.10	1.454471
298	Ammunition, Except For Small Arms, N.E.C.	0.00	.000000
299	Small Arms	0.00	.000000
300	Other Ordnance and Accessories	0.00	.000000
301	Industrial and Fluid Valves	1.54	2.086760
302	Steel Springs, Except Wire	0.00	.000000
303	Pipe, Valves, and Pipe Fittings	1.21	1.552350
304	Miscellaneous Fabricated Wire Products	1.18	1.678421
305	Metal Foil and Leaf	0.00	.000000
306	Fabricated Metal Products, N.E.C.	1.52	2.249346
307	Steam Engines and Turbines	1.44	2.024695
308	Internal Combustion Engines, N.E.C.	1.86	2.699536
309	Farm Machinery and Equipment	1.51	1.910510
310	Lawn and Garden Equipment	0.00	.000000
311	Construction Machinery and Equipment	0.00	.000000
312	Mining Machinery, Except Oil Field	0.00	.000000
313	Oil Field Machinery	0.00	.000000
314	Elevators and Moving Stairways	1.24	2.718782
315	Conveyors and Conveying Equipment	1.34	2.121379
316	Hoists, Cranes, and Monorails	1.27	1.892990
317	Industrial Trucks and Tractors	1.54	2.097126
318	Machine Tools, Metal Cutting Types	1.20	1.759655
319	Machine Tools, Metal Forming Types	0.00	.000000
320	Industrial Patterns	0.00	.000000
321	Special Dies and Tools and Accessories	1.14	1.650101
322	Power Driven Hand Tools	1.41	2.062033
323	Rolling Mill Machinery	0.00	.000000

SIC	Industry	Type I Multiplier*	Type II Multiplier**
324	Welding Apparatus	0.00	.000000
325	Metalworking Machinery, N.E.C.	0.00	.000000
326	Textile Machinery	0.00	.000000
327	Woodworking Machinery	1.38	2.049787
328	Paper Industries Machinery	0.00	.000000
329	Printing Trades Machinery	0.00	.000000
330	Food Products Machinery	1.24	1.633857
331	Special Industry Machinery N.E.C.	1.75	2.426574
332	Pumps and Compressors	1.55	2.543606
333	Ball and Roller Bearings	0.00	.000000
334	Blowers and Fans	1.20	1.769514
335	Packaging Machinery	1.54	2.246748
336	Power Transmission Equipment	1.39	1.931313
337	Industrial Furnaces and Ovens	0.00	.000000
338	General Industrial Machinery, N.E.C	1.36	1.920934
339	Electronic Computers	1.54	2.521556
340	Computer Storage Devices	0.00	.000000
341	Computer Terminals	0.00	.000000
342	Computer Peripheral Equipment,	0.00	.000000
343	Calculating and Accounting Machines	1.14	1.635856
344	Typewriters and Office Machines N.E.C.	1.29	1.789901
345	Automatic Merchandising Machine	0.00	.000000
346	Commercial Laundry Equipment	0.00	.000000
347	Refrigeration and Heating Equipment	1.65	2.337321
348	Measuring and Dispensing Pumps	0.00	.000000
349	Service Industry Machines, N.E.C.	1.45	2.071703
350	Carburetors, Pistons, Rings, Valves	0.00	.000000
351	Fluid Power Cylinders & Actuators	1.44	1.946435
352	Fluid Power Pumps & Motors	1.05	1.555422
353	Scales and Balances	1.17	1.601474
354	Industrial Machines N.E.C.	1.27	1.806393
355	Transformers	1.28	1.575444
356	Switchgear and Switchboard Apparatus	1.28	1.685809
357	Motors and Generators	1.34	2.072946
358	Carbon and Graphite Products	0.00	.000000
359	Relays & Industrial Controls	1.51	2.320180
360	Electrical Industrial Apparatus, N.E.C.	0.00	.000000
361	Household Cooking Equipment	1.54	2.465793
362	Household Refrigerators and Freezers	0.00	.000000
363	Household Laundry Equipment	0.00	.000000
364	Electric Housewares and Fans	1.28	1.968838
365	Household Vacuum Cleaners	0.00	.000000
366	Household Appliances, N.E.C.	0.00	.000000
367	Electric Lamps	0.00	.000000
368	Wiring Devices	1.19	1.540758
369	Lighting Fixtures and Equipment	1.48	2.117395
370	Radio and TV Receiving Sets	0.00	.000000

SIC	Industry	Type I Multiplier*	Type II Multiplier**
371	Phonograph Records and Tape	0.00	.000000
372	Telephone and Telegraph Apparatus	1.35	2.192938
373	Radio and TV Communication Equipment	1.38	1.714574
374	Communications Equipment N.E.C.	0.00	.000000
375	Electron Tubes	0.00	.000000
376	Printed Circuit Boards	1.11	1.520931
377	Semiconductors and Related Devices	0.00	.000000
378	Electronic Components, N.E.C.	1.52	2.058901
379	Storage Batteries	1.45	2.054118
380	Primary Batteries, Dry and Wet	0.00	.000000
381	Engine Electrical Equipment	1.21	1.568402
382	Magnetic & Optical Recording Media	0.00	.000000
383	Electrical Equipment, N.E.C.	0.00	.000000
384	Motor Vehicles	0.00	.000000
385	Truck and Bus Bodies	1.52	2.333008
386	Motor Vehicle Parts and Accessories	1.61	2.335053
387	Truck Trailers	1.61	2.351296
388	Motor Homes	0.00	.000000
389	Aircraft	1.27	1.918651
390	Aircraft and Missile Engines and Parts	1.43	2.016881
391	Aircraft and Missile Equipment,	1.41	2.045319
392	Ship Building and Repairing	1.19	1.553213
393	Boat Building and Repairing	1.28	1.650013
394	Railroad Equipment	0.00	.000000
395	Motorcycles, Bicycles, and Parts	1.39	1.915825
396	Complete Guided Missiles	0.00	.000000
397	Travel Trailers and Camper	0.00	.000000
398	Tanks and Tank Components	0.00	.000000
399	Transportation Equipment, N.E.C	1.72	2.288360
400	Search & Navigation Equipment	1.61	2.011162
401	Laboratory Apparatus & Furniture	0.00	.000000
402	Automatic Temperature Controls	1.07	1.480412
403	Mechanical Measuring Devices	1.33	1.924515
404	Instruments To Measure Electricity	0.00	.000000
405	Analytical Instruments	0.00	.000000
406	Optical Instruments & Lenses	0.00	.000000
407	Surgical and Medical Instrument	1.64	2.659967
408	Surgical Appliances and Supplies	1.63	2.578562
409	Dental Equipment and Supplies	0.00	.000000
410	X-Ray Apparatus	1.49	3.645216
411	Electromedical Apparatus	0.00	.000000
412	Ophthalmic Goods	1.36	1.866321
413	Photographic Equipment and Supplies	1.95	2.503144
414	Watches, Clocks, and Parts	0.00	.000000
415	Jewelry, Precious Metal	1.24	1.733603
416	Silverware and Plated Ware	0.00	.000000
417	Jewelers Materials and Lapidary Work	0.00	.000000

SIC	Industry	Type I Multiplier*	Type II Multiplier**
418	Musical Instruments	0.00	.000000
419	Dolls	0.00	.000000
420	Games, Toys, and Childrens Vehicles	0.00	.000000
421	Sporting and Athletic Goods, N.E.C.	1.33	1.866850
422	Pens and Mechanical Pencils	0.00	.000000
423	Lead Pencils and Art Goods	1.50	2.235566
424	Marking Devices	0.00	.000000
425	Carbon Paper and Inked Ribbons	1.38	2.133309
426	Costume Jewelry	0.00	.000000
427	Fasteners, Buttons, Needles, Pins	0.00	.000000
428	Brooms and Brushes	0.00	.000000
429	Signs and Advertising Displays	1.29	1.744547
430	Burial Caskets and Vaults	0.00	.000000
431	Hard Surface Floor Coverings	0.00	.000000
432	Manufacturing Industries, N.E.C.	1.28	1.548953
433	Railroads and Related Services	1.55	2.655544
434	Local, Interurban Passenger Transit	1.11	1.474616
435	Motor Freight Transport and Warehousing	1.60	2.250902
436	Water Transportation	2.09	2.869434
437	Air Transportation	1.32	2.020314
438	Pipe Lines, Except Natural Gas	0.00	.000000
439	Arrangement Of Passenger Transportation	1.09	1.377752
440	Transportation Services	1.34	1.851214
441	Communications, Except Radio and TV	1.40	2.370128
442	Radio and TV Broadcasting	1.92	2.843930
443	Electric Services	1.62	2.660175
444	Gas Production and Distribution	2.08	3.382328
445	Water Supply and Sewerage Systems	0.00	.000000
446	Sanitary Services and Steam Supply	1.40	2.068764
447	Wholesale Trade	1.34	1.943054
448	Building Materials & Gardening	1.03	1.323058
449	General Merchandise Stores	1.05	1.237412
450	Food Stores	1.05	1.260924
451	Automotive Dealers & Service Stations	1.18	1.659898
452	Apparel & Accessory Stores	1.11	1.316331
453	Furniture & Home Furnishings Stores	1.07	1.375045
454	Eating & Drinking	1.12	1.327912
455	Miscellaneous Retail	1.08	1.264626
456	Banking	1.32	1.951602
457	Credit Agencies	1.21	1.578014
458	Security and Commodity Brokers	1.16	2.398028
459	Insurance Carriers	1.83	2.700099
460	Insurance Agents and Brokers	1.17	1.564341
461	Owner-occupied Dwellings	0.00	.000000
462	Real Estate	1.63	1.982521
463	Hotels and Lodging Places	1.30	1.710963

SIC	Industry	Type I Multiplier*	Type II Multiplier**
464	Laundry, Cleaning and Shoe Repair	1.13	1.331502
465	Portrait and Photographic Studios	1.24	1.512478
466	Beauty and Barber Shops	1.25	1.503611
467	Funeral Service and Crematories	1.07	1.307266
468	Miscellaneous Personal Services	1.42	1.661336
469	Advertising	1.34	1.922644
470	Other Business Services	1.32	1.719457
471	Photofinishing, Commercial Photography	1.35	1.721063
472	Services To Buildings	1.09	1.316483
473	Equipment Rental and Leasing	1.51	2.176624
474	Personnel Supply Services	1.02	1.198840
475	Computer and Data Processing Services	1.25	1.979563
476	Detective and Protective Services	1.05	1.266773
477	Automobile Rental and Leasing	1.41	1.839364
478	Automobile Parking and Car Wash	1.10	1.268208
479	Automobile Repair and Services	1.52	1.976359
480	Electrical Repair Service	1.18	1.535581
481	Watch, Clock, Jewelry and Furniture Repair	1.20	1.441200
482	Miscellaneous Repair Shops	1.22	1.522382
483	Motion Pictures	1.68	2.127049
484	Theatrical Producers, Bands Etc.	1.85	2.332468
485	Bowling Alleys and Pool Halls	1.13	1.294943
486	Commercial Sports Except Racing	1.01	1.268569
487	Racing and Track Operation	1.19	1.368907
488	Amusement and Recreation Services, N.E.C.	1.12	1.284657
489	Membership Sports and Recreation Clubs	1.15	1.381267
490	Doctors and Dentists	1.34	2.315060
491	Nursing and Protective Care	1.10	1.385037
492	Hospitals	1.18	1.643822
493	Other Medical and Health Services	1.22	1.648280
494	Legal Services	1.18	1.917278
495	Elementary and Secondary Schools	1.24	1.512214
496	Colleges, Universities, Schools	1.15	1.439435
497	Other Educational Services	1.18	1.482813
498	Job Trainings & Related Services	1.14	1.492287
499	Child Day Care Services	1.17	1.370983
500	Social Services, N.E.C.	1.13	1.409046
501	Residential Care	1.06	1.313500
502	Other Nonprofit Organizations	1.31	1.720305
503	Business Associations	1.10	1.370344
504	Labor and Civic Organizations	1.04	1.133962
505	Religious Organizations	1.58	2.395331
506	Engineering, Architectural Services	1.42	1.988723
507	Accounting, Auditing and Bookkeeping	1.13	1.445064
508	Management and Consulting Services	1.34	1.820185
509	Research, Development & Testing	1.17	1.483703

SIC	Industry	Type I Multiplier*	Type II Multiplier**
	Services		
510	Local Government Passenger Transit	0.00	.000000
511	State and Local Electric Utilities	1.42	2.020327
512	Other State and Local Govt Enterprises	2.25	3.061463
513	U.S. Postal Service	1.18	1.901396
514	Federal Electric Utilities	2.98	4.707977
515	Other Federal Government Enterprises	1.09	1.501145
516	Noncomparable Imports	0.00	.000000
517	Scrap	0.00	.000000
518	Used and Secondhand Goods	0.00	.000000
519	Federal Government - Military	1.00	1.358250
520	Federal Government - Non-Military	0.00	.000000
521	Commodity Credit Corporation	0.00	.000000
522	State & Local Government - Education	0.00	.000000
523	State & Local Government - Non-Education	0.00	.000000
524	Rest Of The World Industry	0.00	.000000
525	Domestic Services	0.00	.000000
526	Dummy	0.00	.000000
527	Dummy	0.00	.000000
528	Inventory Valuation Adjustment	0.00	.000000
*Type I=(Direct + Indirect)/Direct			1.00
**Type II =(Direct + Indirect + Induced)/Direct			

Appendix B: Operations and Business Plan Analyses

Table B.1. EDC building and land inventory for DDMT.

Building Number	Conveyance Method	Proposed Action	Proposed Reuse	Phase	Square Feet	Current Use
144	PBC	PBC	PBC	1	101,270	Administration
145	EDC	Reuse	Security	1	860	Guard House
176	PBC	PBC	PBC	1	4,787	Residence
178	EDC	Reuse	PBC	1	1,440	Carport
179	EDC	Reuse	PBC	1	4,787	Residence
181	EDC	Reuse	PBC	1	4,787	Residence
183	EDC	Reuse	PBC	1	1,440	Carport
184	EDC	Reuse	PBC	1	4,787	Residence
195	EDC	Reuse	PBC	2	5,500	Golf & Recreation
195	EDC	Reuse	PBC	2	1,271	Golf & Recreation
198	EDC	Reuse	PBC	2	323	Golf & Recreation
209	EDC	Demo	None	3	218,286	Warehouse
210	EDC	Demo	None	3	219,761	Office/Warehouse
229	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
230	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
249	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
250	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
251	EDC	Reuse	Police Precinct	1	7,985	Maintenance
252	EDC	Reuse	Police Precinct	1	8,455	Maintenance
253	EDC	Reuse	Police Precinct	1	9,127	Maintenance
257	EDC	Demo	None	1	264	Maintenance
260	EDC	Reuse	Police Precinct	1	5,589	Maintenance
261	EDC	Reuse	Police Precinct	1	6,249	Maintenance
265	EDC	Reuse	Police Precinct	1	7,988	Maintenance
270	EDC	Reuse	Police Precinct	1	14,094	Maintenance
271	EDC	Demo	None	1	1,436	Office
274	EDC	Reuse	Police Precinct	1	13,500	Cafeteria
308	EDC	Demo	None	4	4,224	Hazardous Storage
309	EDC	Demo	None	4	4,224	Hazardous Storage
319	EDC	Demo	None	4	18,000	Flammable Storage
329	EDC	Reuse	Light Manufacturing	4	109,994	Twenty Typical
330	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
349	EDC	Demo	None	2	109,994	Twenty Typical
350	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
359	EDC	Demo	None	1	217,685	Refrigerated Warehouse
360	EDC	Reuse	Distribution/Service	1	206,758	New Warehouse
416	EDC	Demo	None	4	2,600	Storage
417	EDC	Demo	None	4	3,120	Warehouse
429	EDC	Reuse	Light Manufacturing	4	109,994	Twenty Typical
430	EDC	Reuse	Light Manufacturing	3	109,994	Twenty Typical
449	EDC	Demo	None	3	109,994	Twenty Typical
450	EDC	Reuse	Light Manufacturing	3	109,994	Twenty Typical
459	EDC	Demo	None	1	3,308	Classroom
465	EDC	Demo	None	1	400	Fork Lift Wash
468	EDC	Demo	None	1	9,600	Storage
469	EDC	Demo	None	1	9,600	Storage
470	EDC	Reuse	Distribution/Service	2	206,656	Korean Type
489	EDC	Reuse	Distribution/Service	2	206,656	Korean Type
490	EDC	Reuse	Distribution/Service	2	206,656	Korean Type
529	EDC	Reuse	Light Manufacturing	4	109,994	Twenty Typical
530	EDC	Reuse	Light Manufacturing	3	109,994	Twenty Typical
549	EDC	Demo	None	3	109,994	Twenty Typical
550	EDC	Reuse	Light Manufacturing	3	109,994	Twenty Typical
559	EDC	Demo	None	1	218,105	Warehouse
560	EDC	Reuse	Distribution/Service	1	206,758	Newer Warehouse
629	EDC	Reuse	Light Manufacturing	2	109,994	Twenty Typical
630	EDC	Reuse	Light Manufacturing	3	109,994	Twenty Typical
649	EDC	Demo	None	3	112,400	Twenty Typical
650	EDC	Reuse	Light Manufacturing	3	109,994	Twenty Typical
670	EDC	Reuse	Distribution/Service	2	206,645	Korean Type
685	EDC	Reuse	Distribution/Service	2	45,942	Korean Type
689	EDC	Reuse	Distribution/Service	2	216,431	Korean Type
690	EDC	Reuse	Distribution/Service	2	206,656	Korean Type
720	EDC	Demo	None	5	4,665	Fueling
737	EDC	Demo	None	5	5,744	Pesticides/Herbicides
770	EDC	Demo	None	5	27,326	Maintenance
783	EDC	Demo	None	5	24,096	Storage
787	EDC	Demo	None	5	5,038	Warehouse
793	EDC	Demo	None	5	1,813	Storage
835	EDC	Reuse	Distribution/Service	4	141,316	Hazardous Storage
865	EDC	Demo	None	4	3,684	Hazardous Storage
873	EDC	Demo	None	5	253,581	Warehouse
875	EDC	Demo	None	5	253,581	Warehouse
925	EDC	Reuse	PBC	2	60,000	Special Purpose Warehouse
949	EDC	Demo	None	5	60,000	Storage
970	EDC	Demo	None	5	253,581	Warehouse
972	EDC	Demo	None	5	253,581	Box Shop/Packing
995	EDC	Demo	None	5	10,244	Storage
1086	EDC	Demo	None	5	9,640	Loading
1087	EDC	Demo	None	5	4,927	Paint Shop
1088	EDC	Demo	None	5	1,272	Sandblasting
TOTAL					6461625	#REF!

15-Year Absorption and Revenue Projection Defense Depot Memphis

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
ABSORPTION	1998	1999	2000	2001	2002	2003	2004	2005	2006
Leased Space (SF)	1	1	1	1	1	1	1	1	1
Typical 20	-	-	109,994	109,994	109,994	109,994	109,994	98,995	98,995
Typical 20	-	-	-	109,994	109,994	109,994	109,994	109,994	98,995
Typical 20	-	-	-	-	109,994	109,994	109,994	109,994	109,994
Typical 20	-	-	-	-	-	109,994	109,994	109,994	109,994
Typical 20	-	-	-	-	-	109,994	109,994	109,994	109,994
Typical 20	-	-	-	-	-	-	109,994	109,994	109,994
Typical 20	-	-	-	-	-	-	-	109,994	109,994
Typical 20	-	-	-	-	-	-	-	-	109,994
Typical 20	-	-	-	-	-	-	-	-	-
Typical 20	-	-	-	-	-	-	-	-	-
Typical 20	-	-	-	-	-	-	-	-	-
Typical 20	-	-	-	-	-	-	-	-	-
Korean Typical-685	45,942	45,942	45,942	45,942	45,942	41,348	41,348	41,348	41,348
Korean Typical-689	218,431	218,431	218,431	218,431	218,431	194,788	194,788	194,788	194,788
Korean Typical-690	206,656	206,656	206,656	206,656	206,656	185,990	185,990	185,990	185,990
Korean Typical	-	206,656	206,656	206,656	206,656	206,656	206,656	206,656	185,990
Korean Typical	-	-	-	206,656	206,656	206,656	206,656	206,656	206,656
Korean Typical	-	-	-	-	206,656	206,656	206,656	206,656	206,656
Korean Typical	-	206,758	206,758	206,758	206,758	206,758	186,082	186,082	186,082
Building 360	-	-	206,758	206,758	206,758	206,758	206,758	186,082	186,082
Building 560	-	-	-	141,316	141,316	141,316	141,316	141,316	127,184
Building 835	-	-	-	-	-	-	-	-	-
Cumulative Leased Space (SF)	469,029	882,443	1,199,195	1,657,161	1,973,811	2,353,552	2,422,205	2,500,524	2,564,721
REVENUES									
Leased Space	0	0	164,991	164,991	164,991	164,991	164,991	168,005	168,005
Typical 20	0	0	0	164,991	164,991	164,991	164,991	164,991	168,005
Typical 20	0	0	0	0	164,991	164,991	164,991	164,991	164,991
Typical 20	0	0	0	0	0	164,991	164,991	164,991	164,991
Typical 20	0	0	0	0	0	164,991	164,991	164,991	164,991
Typical 20	0	0	0	0	0	0	164,991	164,991	164,991
Typical 20	0	0	0	0	0	0	0	164,991	164,991
Typical 20	0	0	0	0	0	0	0	0	164,991
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Typical 20	0	0	0	0	0	0	0	0	0
Korean Typical-685	91,884	91,884	91,884	91,884	91,884	93,563	93,563	93,563	93,563
Korean Typical-689	432,862	432,862	432,862	432,862	432,862	440,770	440,770	440,770	440,770
Korean Typical-690	413,312	413,312	413,312	413,3					

Scenario: DDMT Recast

Year 4 2001	Year 5 2002	Year 6 2003	Year 7 2004	Year 8 2005	Year 9 2006	Year 10 2007	Year 11 2008	Year 12 2009	Year 13 2010	Year 14 2011	Year 15 2012	Cumulative Forecas 5 Year Total 10 Year Total	
1	1	1	1	1	1	1	1	1	1	1	1		
994	109,994	109,994	109,994	98,995	98,995	98,995	98,995	98,995	98,995	98,995	98,995		
994	109,994	109,994	109,994	109,994	98,995	98,995	98,995	98,995	98,995	98,995	98,995		
-	109,994	109,994	109,994	109,994	109,994	98,995	98,995	98,995	98,995	98,995	98,995		
-	-	109,994	109,994	109,994	109,994	109,994	98,995	98,995	98,995	98,995	98,995		
-	-	109,994	109,994	109,994	109,994	109,994	98,995	98,995	98,995	98,995	98,995		
-	-	-	109,994	109,994	109,994	109,994	98,995	98,995	98,995	98,995	98,995		
-	-	-	-	109,994	109,994	109,994	109,994	109,994	98,995	98,995	98,995		
-	-	-	-	-	109,994	109,994	109,994	109,994	109,994	98,995	98,995		
-	-	-	-	-	-	109,994	109,994	109,994	109,994	109,994	98,995		
-	-	-	-	-	-	-	109,994	109,994	109,994	109,994	109,994		
-	-	-	-	-	-	-	-	109,994	109,994	109,994	109,994		
-	-	-	-	-	-	-	-	-	109,994	109,994	109,994		
-	-	-	-	-	-	-	-	-	-	65,996	65,996		
-	-	-	-	-	-	-	-	-	-	-	153,992		
-	-	-	-	-	-	-	-	-	-	-	-		
988	329,982	549,970	659,964	758,959	857,953	956,948	1,044,943	1,143,938	1,242,932	1,297,929	1,440,921	1,759,904	0.82
942	45,942	41,348	41,348	41,348	41,348	41,348	41,348	41,348	41,348	41,348	41,348		
431	216,431	194,788	194,788	194,788	194,788	194,788	194,788	194,788	194,788	194,788	194,788		
656	206,656	185,990	185,990	185,990	185,990	185,990	185,990	185,990	185,990	185,990	185,990		
656	206,656	206,656	185,990	185,990	185,990	185,990	185,990	185,990	185,990	185,990	185,990		
656	206,656	206,656	206,656	206,656	185,990	185,990	185,990	185,990	185,990	185,990	185,990		
-	206,656	206,656	206,656	206,656	185,990	185,990	185,990	185,990	185,990	185,990	185,990		
-	-	206,656	206,656	206,656	206,656	185,990	185,990	185,990	185,990	185,990	185,990		
758	206,758	206,758	186,082	186,082	186,082	186,082	186,082	186,082	186,082	186,082	186,082		
758	206,758	206,758	206,758	186,082	186,082	186,082	186,082	186,082	186,082	186,082	186,082		
316	141,316	141,316	141,316	141,316	127,184	127,184	127,184	127,184	127,184	127,184	127,184		
161	1,973,811	2,353,552	2,422,205	2,500,524	2,564,721	2,643,050	2,710,380	2,809,374	2,908,369	2,963,366	3,106,358		
												Total Leasable SF 86.04% Occupancy Percent	
991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	168,005	168,005	168,005	168,005	494,973	1,328,971
991	164,991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	168,005	168,005	168,005	329,982	1,160,965
0	164,991	164,991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	168,005	168,005	164,991	992,960
0	0	164,991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	168,005	168,005	0	824,955
0	0	164,991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	168,005	168,005	0	824,955
0	0	0	164,991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	168,005	0	659,964
0	0	0	0	164,991	164,991	164,991	164,991	168,005	168,005	168,005	168,005	0	494,973
0	0	0	0	0	164,991	164,991	164,991	164,991	164,991	168,005	168,005	0	329,982
0	0	0	0	0	0	164,991	164,991	164,991	164,991	164,991	168,005	0	164,991
0	0	0	0	0	0	0	164,991	164,991	164,991	164,991	164,991	0	0
0	0	0	0	0	0	0	0	164,991	164,991	164,991	164,991	0	0
0	0	0	0	0	0	0	0	0	164,991	164,991	164,991	0	0
0	0	0	0	0	0	0	0	0	0	112,003	112,003	0	0
0	0	0	0	0	0	0	0	0	0	0	261,341	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
384	91,884	93,563	93,563	93,563	93,563	93,563	93,563	93,563	93,563	93,563	93,563	459,420	927,233
362	432,862	440,770	440,770	440,770	440,770	440,770	440,770	440,770	440,770	440,770	440,770	2,164,310	4,368,160
312	413,312	420,863	420,863	420,863	420,863	420,863	420,863	420,863	420,863	420,863	420,863	2,066,560	4,170,874
312	413,312	413,312	420,863	420,863	420,863	420,863	420,863	420,863	420,863	420,863	420,863	1,653,248	3,750,011
312	413,312	413,312	413,312	413,312	420,863	420,863	420,863	420,863	420,863	420,863	420,863	826,624	2,908,286
0	413,312	413,312	413,312	413,312	413,312	420,863	420,863	420,863	420,863	420,863	420,863	413,312	2,487,423
0	0	413,312	413,312	413,312	413,312	413,312	420,863	420,863	420,863	420,863	420,863	0	2,066,560
585	568,585	568,585	578,972	578,972	578,972	578,972	578,972	578,972	578,972	578,972	578,972	2,274,338	5,158,810
995	516,895	516,895	516,895	526,338	526,338	526,338	526,338	526,338	526,338	526,338	526,338	1,550,685	4,163,489
348	423,948	423,948	423,948	423,948	431,693	431,693	431,693	431,693	431,693	431,693	431,693	847,896	2,983,126
92	\$ 4,182,395	\$ 4,942,826	\$ 5,125,755	\$ 5,303,204	\$ 5,486,505	\$ 5,662,061	\$ 5,840,631	\$ 6,008,636	\$ 6,176,641	\$ 6,291,659	\$ 6,556,015	13,246,339	39,766,689
45	\$ 13,246,339	\$ 18,189,165	\$ 23,314,920	\$ 28,618,124	\$ 34,104,628	\$ 39,766,689	\$ 45,607,320	\$ 51,615,956	\$ 57,792,597	\$ 64,084,256	\$ 70,640,271		
19	\$ 473,715	\$ 564,853	\$ 581,329	\$ 600,126	\$ 615,533	\$ 634,332	\$ 650,491	\$ 674,250	\$ 698,008	\$ 711,208	\$ 745,526		

228	1,636,578	1,256,837	1,188,184	1,109,866	1,045,668	967,339	900,010	801,015	702,020	647,023	504,031		
56	\$ 1,194,702	\$ 917,491	\$ 867,375	\$ 810,202	\$ 763,338	\$ 706,158	\$ 657,007	\$ 584,741	\$ 512,475	\$ 472,327	\$ 367,943		

Year 12 2009	Year 13 2010	Year 14 2011	Year 15 2012	Cumulative Forecast		
				5 Year Total	10 Year Total	15 year Total
1	1	1	1			
98,995	98,995	98,995	98,995			
98,995	98,995	98,995	98,995			
98,995	98,995	98,995	98,995			
98,995	98,995	98,995	98,995			
98,995	98,995	98,995	98,995			
98,995	98,995	98,995	98,995			
109,994	98,995	98,995	98,995			
109,994	109,994	98,995	98,995			
109,994	109,994	109,994	98,995			
109,994	109,994	109,994	109,994			
109,994	109,994	109,994	109,994			
-	109,994	109,994	109,994			
-	-	65,996	65,996			
-	-	-	153,992			
-	-	-	-			
-	-	-	-			
143,938	1,242,932	1,297,929	1,440,921	1,759,904	0.82	
41,348	41,348	41,348	41,348			
194,788	194,788	194,788	194,788			
185,990	185,990	185,990	185,990			
185,990	185,990	185,990	185,990			
185,990	185,990	185,990	185,990			
185,990	185,990	185,990	185,990			
185,990	185,990	185,990	185,990			
186,082	186,082	186,082	186,082			
186,082	186,082	186,082	186,082			
127,184	127,184	127,184	127,184			
309,374	2,908,369	2,963,366	3,106,358			
			3,610,389			
			86.04%	Total Leasable SF Occupancy Percent		
168,005	168,005	168,005	168,005	494,973	1,328,971	2,168,997
168,005	168,005	168,005	168,005	329,982	1,160,965	2,000,992
168,005	168,005	168,005	168,005	164,991	992,960	1,832,986
168,005	168,005	168,005	168,005	0	824,955	1,664,981
168,005	168,005	168,005	168,005	0	824,955	1,664,981
168,005	168,005	168,005	168,005	0	659,964	1,496,976
164,991	168,005	168,005	168,005	0	494,973	1,328,971
164,991	164,991	168,005	168,005	0	329,982	1,160,965
164,991	164,991	164,991	168,005	0	164,991	992,960
164,991	164,991	164,991	164,991	0	0	824,955
164,991	164,991	164,991	164,991	0	0	659,964
0	164,991	164,991	164,991	0	0	494,973
0	0	112,003	112,003	0	0	224,007
0	0	0	261,341	0	0	261,341
0	0	0	0	0	0	0
0	0	0	0	0	0	0
93,563	93,563	93,563	93,563	459,420	927,233	1,395,046
440,770	440,770	440,770	440,770	2,164,310	4,368,160	6,572,010
420,863	420,863	420,863	420,863	2,066,560	4,170,874	6,275,188
420,863	420,863	420,863	420,863	1,653,248	3,750,011	5,854,325
420,863	420,863	420,863	420,863	826,624	2,908,286	5,012,600
420,863	420,863	420,863	420,863	413,312	2,487,423	4,591,737
420,863	420,863	420,863	420,863	0	2,066,560	4,170,874
578,972	578,972	578,972	578,972	2,274,338	5,158,810	8,053,670
526,338	526,338	526,338	526,338	1,550,685	4,163,489	6,795,180
431,693	431,693	431,693	431,693	847,896	2,983,126	5,141,592
108,636 \$	6,176,641 \$	6,291,659 \$	6,556,015 \$	13,246,339	39,766,689	70,640,271
115,956 \$	57,792,597 \$	64,084,256 \$	70,640,271			
174,250 \$	698,008 \$	711,208 \$	745,526			
801,015	702,020	647,023	504,031			
84,741 \$	512,475 \$	472,327 \$	367,943			

Table B.3. Summary of capital improvements.

**Projected Infrastructure Improvements
Memphis Defense Depot**

Scenario: DDMT Recast

		Year 1 1998	Year 2 1999	Year 3 2000	Year 4 2001	Year 5 2002	Year 6 2003	Year 7 2004
CAPITAL EXPENDITURES	Basis							
Infrastructure								
Perimeter Landscaping								
Landscape Buffer	\$ - \$	- \$	150,000 \$	150,000 \$	- \$	- \$	- \$	- \$
Wrought Iron Fence on Airways Blvd.	\$ - \$	- \$	75,000 \$	75,000 \$	- \$	- \$	- \$	- \$
Entrance Landscaping	\$ - \$	- \$	25,000 \$	25,000 \$	- \$	- \$	- \$	- \$
Interior Landscaping	\$ - \$	- \$	50,000 \$	50,000 \$	16,667 \$	16,667 \$	16,666 \$	25,000 \$
Street Trees	\$ - \$	- \$	100,000 \$	100,000 \$	66,667 \$	66,666 \$	66,667 \$	- \$
Parking Lot Landscaping	\$ - \$	- \$	37,500 \$	37,500 \$	16,666 \$	16,667 \$	16,667 \$	- \$
Subtotal - Perimeter Landscaping	\$ - \$	- \$	437,500 \$	437,500 \$	100,000 \$	100,000 \$	100,000 \$	25,000 \$
Signage								
Main Entrance	\$ - \$	- \$	10,000 \$	10,000 \$	- \$	- \$	- \$	- \$
Sign at Airways Blvd. & Dunn Road	\$ - \$	- \$	10,000 \$	10,000 \$	- \$	- \$	- \$	- \$
Secondary Entrances	\$ - \$	- \$	5,000 \$	5,000 \$	- \$	- \$	- \$	- \$
Subtotal - Signage	\$ - \$	- \$	25,000 \$	25,000 \$	- \$	- \$	- \$	- \$
Internal Road Signs	\$ - \$	- \$	5,000 \$	5,000 \$	3,334 \$	3,333 \$	3,333 \$	5,000 \$
Sanitary Sewer Update								
Inspection Report, Tape, etc.	\$ - \$	- \$	175,000 \$	175,000 \$	- \$	- \$	- \$	- \$
Removal/Replacement of Pipes/Mains	\$ - \$	- \$	- \$	- \$	83,334 \$	83,333 \$	83,333 \$	75,000 \$
Structures	\$ - \$	- \$	- \$	- \$	41,667 \$	41,667 \$	41,666 \$	25,000 \$
Service Lines	\$ - \$	- \$	10,000 \$	10,000 \$	33,334 \$	33,333 \$	33,333 \$	- \$
Subtotal - Sanitary Sewer	\$ - \$	- \$	185,000 \$	185,000 \$	158,335 \$	158,333 \$	158,332 \$	100,000 \$
Water Distribution Upgrade								
System Modification (West & Northeast L1 Areas)	\$ - \$	- \$	150,000 \$	150,000 \$	33,334 \$	33,333 \$	33,333 \$	125,000 \$
Removal & Installation of Fire Hydrants/Valve Boxes	\$ - \$	- \$	150,000 \$	150,000 \$	50,000 \$	50,000 \$	50,000 \$	100,000 \$
Meters/Connections	\$ - \$	- \$	125,000 \$	125,000 \$	50,000 \$	50,000 \$	50,000 \$	100,000 \$
Subtotal - Water Distribution	\$ - \$	- \$	425,000 \$	425,000 \$	133,334 \$	133,333 \$	133,333 \$	325,000 \$
Telecommunications Upgrade	\$ - \$	- \$	75,000 \$	75,000 \$	33,334 \$	33,333 \$	33,333 \$	50,000 \$
Electrical System Upgrade								
Electrical Poles Removal/Installation	\$ - \$	- \$	250,000 \$	250,000 \$	- \$	- \$	- \$	- \$
3 & 1 Phase Primary Removal/Install & Riser Install	\$ - \$	- \$	150,000 \$	150,000 \$	- \$	- \$	- \$	- \$
3 & 1 Phase Transformers Removal/Installation	\$ - \$	- \$	162,500 \$	162,500 \$	- \$	- \$	- \$	- \$
Underground Extension	\$ - \$	- \$	350,000 \$	350,000 \$	100,000 \$	100,000 \$	100,000 \$	- \$
Metering (25 8-12 & 1 6-18 Meters) & Removal of Primary Meter	\$ - \$	- \$	100,000 \$	100,000 \$	33,334 \$	33,333 \$	33,333 \$	- \$
Subtotal - Electrical System	\$ - \$	- \$	1,012,500 \$	1,012,500 \$	133,334 \$	133,333 \$	133,333 \$	- \$
Storm Water System Upgrade								
Existing System Modification/Changes due to Parking Areas	\$ - \$	- \$	50,000 \$	50,000 \$	33,334 \$	33,333 \$	33,333 \$	75,000 \$
Removal/Installation of Pipes & Structures	\$ - \$	- \$	62,500 \$	62,500 \$	41,667 \$	41,667 \$	41,666 \$	- \$
Changes to System in Area Sited for Future Development	\$ - \$	- \$	- \$	- \$	33,334 \$	33,333 \$	33,333 \$	50,000 \$
Subtotal - Storm Water System	\$ - \$	- \$	112,500 \$	112,500 \$	108,335 \$	108,333 \$	108,332 \$	125,000 \$
Natural Gas System Upgrade	\$ - \$	- \$	75,000 \$	75,000 \$	33,334 \$	33,333 \$	33,333 \$	75,000 \$
Internal Roadways								
Upgrade Boulevard (G Street), 1st Street South of G Street	\$ - \$	- \$	450,000 \$	450,000 \$	- \$	- \$	- \$	- \$
New Road that Parallels Dunn Ave., Upgrade 2nd Street	\$ - \$	- \$	- \$	- \$	- \$	- \$	- \$	400,000 \$
Upgrade 4th Street, J Street, 3rd Street	\$ - \$	- \$	- \$	- \$	233,334 \$	233,333 \$	233,333 \$	- \$

Scenario: DDMT Recast

Year 3 2000	Year 4 2001	Year 5 2002	Year 6 2003	Year 7 2004	Year 8 2005	Year 9 2006	Year 10 2007	Year 11 2008	Year 12 2009	Year 13 2010	Year 14 2011	Year 15 2012
150,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
75,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
25,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
50,000 \$	16,667 \$	16,667 \$	16,666 \$	25,000 \$	25,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
100,000 \$	66,667 \$	66,666 \$	66,667 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
37,500 \$	16,666 \$	16,667 \$	16,667 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
437,500 \$	100,000 \$	100,000 \$	100,000 \$	25,000 \$	25,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
10,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
10,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
5,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
25,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
5,000 \$	3,334 \$	3,333 \$	3,333 \$	5,000 \$	5,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
175,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
- \$	83,334 \$	83,333 \$	83,333 \$	75,000 \$	75,000 \$	- \$	- \$	- \$	120,000 \$	- \$	- \$	- \$
- \$	41,667 \$	41,667 \$	41,666 \$	25,000 \$	25,000 \$	66,667 \$	66,667 \$	66,666 \$	50,000 \$	- \$	- \$	- \$
10,000 \$	33,334 \$	33,333 \$	33,333 \$	- \$	- \$	- \$	- \$	- \$	30,000 \$	- \$	- \$	- \$
185,000 \$	158,335 \$	158,333 \$	158,332 \$	100,000 \$	100,000 \$	66,667 \$	66,667 \$	66,666 \$	200,000 \$	- \$	- \$	- \$
150,000 \$	33,334 \$	33,333 \$	33,333 \$	125,000 \$	125,000 \$	- \$	- \$	- \$	100,000 \$	83,334 \$	83,333 \$	83,333 \$
150,000 \$	50,000 \$	50,000 \$	50,000 \$	100,000 \$	100,000 \$	- \$	- \$	- \$	150,000 \$	- \$	- \$	- \$
125,000 \$	50,000 \$	50,000 \$	50,000 \$	100,000 \$	100,000 \$	- \$	- \$	- \$	100,000 \$	- \$	- \$	- \$
425,000 \$	133,334 \$	133,333 \$	133,333 \$	325,000 \$	325,000 \$	- \$	- \$	- \$	350,000 \$	83,334 \$	83,333 \$	83,333 \$
75,000 \$	33,334 \$	33,333 \$	33,333 \$	50,000 \$	50,000 \$	33,334 \$	33,333 \$	33,333 \$	- \$	66,667 \$	66,667 \$	66,666 \$
250,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	100,000 \$	100,000 \$	100,000 \$	100,000 \$
150,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	75,000 \$	- \$	- \$	- \$
162,500 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	50,000 \$	- \$	- \$	- \$
350,000 \$	100,000 \$	100,000 \$	100,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
100,000 \$	33,334 \$	33,333 \$	33,333 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
1,012,500 \$	133,334 \$	133,333 \$	133,333 \$	- \$	- \$	- \$	- \$	- \$	225,000 \$	100,000 \$	100,000 \$	100,000 \$
50,000 \$	33,334 \$	33,333 \$	33,333 \$	75,000 \$	75,000 \$	- \$	- \$	- \$	- \$	83,333 \$	83,334 \$	83,333 \$
62,500 \$	41,667 \$	41,667 \$	41,666 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
- \$	33,334 \$	33,333 \$	33,333 \$	50,000 \$	50,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
112,500 \$	108,335 \$	108,333 \$	108,332 \$	125,000 \$	125,000 \$	- \$	- \$	- \$	- \$	83,333 \$	83,334 \$	83,333 \$
75,000 \$	33,334 \$	33,333 \$	33,333 \$	75,000 \$	75,000 \$	50,000 \$	50,000 \$	50,000 \$	150,000 \$	33,333 \$	33,333 \$	33,334 \$
450,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
- \$	- \$	- \$	- \$	400,000 \$	400,000 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
- \$	233,334 \$	233,333 \$	233,333 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$

Year 9 2006	Year 10 2007	Year 11 2008	Year 12 2009	Year 13 2010	Year 14 2011	Year 15 2012	Cumulative Forecast		
							5 Year Total	10 Year Total	15 year Total
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	300,000 \$	300,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	150,000 \$	150,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	50,000 \$	50,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	150,000 \$	200,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	400,000 \$	400,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	125,000 \$	125,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	875,000 \$	1,225,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	20,000 \$	20,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	20,000 \$	20,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	10,000 \$	10,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	50,000 \$	50,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	20,000 \$	30,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	350,000 \$	350,000
- \$	- \$	- \$	120,000 \$	- \$	- \$	- \$	\$	250,000 \$	520,000
.667 \$	66,667 \$	66,666 \$	50,000 \$	- \$	- \$	- \$	\$	125,000 \$	425,000
- \$	- \$	- \$	30,000 \$	- \$	- \$	- \$	\$	120,000 \$	150,000
.667 \$	66,667 \$	66,666 \$	200,000 \$	- \$	- \$	- \$	\$	845,000 \$	1,445,000
- \$	- \$	- \$	100,000 \$	83,334 \$	83,333 \$	83,333 \$	\$	366,667 \$	1,000,000
- \$	- \$	- \$	150,000 \$	- \$	- \$	- \$	\$	400,000 \$	800,000
- \$	- \$	- \$	100,000 \$	- \$	- \$	- \$	\$	350,000 \$	700,000
- \$	- \$	- \$	350,000 \$	83,334 \$	83,333 \$	83,333 \$	\$	1,116,667 \$	2,500,000
.334 \$	33,333 \$	33,333 \$	- \$	66,667 \$	66,667 \$	66,666 \$	\$	216,667 \$	650,000
- \$	- \$	- \$	100,000 \$	100,000 \$	100,000 \$	100,000 \$	\$	500,000 \$	900,000
- \$	- \$	- \$	75,000 \$	- \$	- \$	- \$	\$	300,000 \$	375,000
- \$	- \$	- \$	50,000 \$	- \$	- \$	- \$	\$	325,000 \$	375,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	900,000 \$	1,000,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	266,667 \$	300,000
- \$	- \$	- \$	225,000 \$	100,000 \$	100,000 \$	100,000 \$	\$	2,291,667 \$	2,950,000
- \$	- \$	- \$	- \$	83,333 \$	83,334 \$	83,333 \$	\$	166,667 \$	600,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	208,334 \$	250,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	66,667 \$	200,000
- \$	- \$	- \$	- \$	83,333 \$	83,334 \$	83,333 \$	\$	441,668 \$	1,050,000
.000 \$	50,000 \$	50,000 \$	150,000 \$	33,333 \$	33,333 \$	33,334 \$	\$	216,667 \$	800,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	900,000 \$	900,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	- \$	800,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	\$	466,667 \$	700,000

Table B.3. Summary of capital improvements (cont'd).

Roads on West Portion of Installation	\$	-	\$	-	\$	200,000	\$	200,000	\$	466,666	\$	466,667	\$	466,667	\$	125,000	\$
Subtotal - Internal Roads	\$	-	\$	-	\$	650,000	\$	650,000	\$	700,000	\$	700,000	\$	700,000	\$	525,000	\$
Parking Lot Construction	\$	-	\$	-	\$	675,000	\$	675,000	\$	300,000	\$	300,000	\$	300,000	\$	642,500	\$
Buildings																	
Main Administration Building 144 - Code Compliance	\$	-	\$	-	\$	50,000	\$	50,000	\$	-	\$	-	\$	-	\$	-	\$
Main Administration Building 144 - Fire Suppression	\$	-	\$	-	\$	100,000	\$	100,000	\$	-	\$	-	\$	-	\$	-	\$
Typical Twenties Buildings - Code Compliance	\$	-	\$	-	\$	200,000	\$	200,000	\$	150,000	\$	150,000	\$	150,000	\$	-	\$
Typical Twenties Buildings - Fire Suppression	\$	-	\$	-	\$	600,000	\$	600,000	\$	533,334	\$	533,333	\$	533,333	\$	-	\$
Typical Twenties Buildings - Enhancements	\$	-	\$	-	\$	750,000	\$	750,000	\$	500,000	\$	500,000	\$	500,000	\$	375,000	\$
Korean Typical Buildings - Code Compliance	\$	-	\$	-	\$	150,000	\$	150,000	\$	50,000	\$	50,000	\$	50,000	\$	-	\$
Korean Typical Buildings - Fire Suppression	\$	-	\$	-	\$	900,000	\$	900,000	\$	133,334	\$	133,333	\$	133,333	\$	-	\$
Korean Typical Buildings - Enhancements	\$	-	\$	-	\$	150,000	\$	150,000	\$	33,334	\$	33,333	\$	33,333	\$	-	\$
Building 835 - Code Compliance	\$	-	\$	-	\$	25,000	\$	25,000	\$	-	\$	-	\$	-	\$	-	\$
Building 825 - Code Compliance	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Subtotal - Buildings	\$	-	\$	-	\$	2,925,000	\$	2,925,000	\$	1,400,002	\$	1,399,999	\$	1,399,999	\$	375,000	\$
Demolition																	
Building 209,359,465,467,468,469,559	\$	-	\$	-	\$	975,000	\$	975,000	\$	-	\$	-	\$	-	\$	-	\$
Building 210,308,309,319,416,417,949 and Minors	\$	-	\$	-	\$	-	\$	-	\$	306,667	\$	306,667	\$	306,666	\$	-	\$
Building 349,449,549,649,720,737,770,771,783,787,793,860,863	\$	-	\$	-	\$	-	\$	-	\$	316,667	\$	316,667	\$	316,666	\$	475,000	\$
Building 873,875,970,972	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	400,000	\$
Building 995,1064,1066,1087,1088,1089,1090,1091	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Subtotal - Demolition	\$	-	\$	-	\$	975,000	\$	975,000	\$	623,334	\$	623,334	\$	623,332	\$	875,000	\$
Subtotal Capital Improvements	\$	-	\$	-	\$	7,577,500	\$	7,577,500	\$	3,726,676	\$	3,726,684	\$	3,726,680	\$	3,122,500	\$
Capital Improvement Plan Contingency Contingency - 10%	\$	-	\$	-	\$	757,750	\$	757,750	\$	372,668	\$	372,666	\$	372,666	\$	312,250	\$
Total Capital Improvements	\$	-	\$	-	\$	8,335,250	\$	8,335,250	\$	4,099,344	\$	4,099,330	\$	4,099,326	\$	3,434,750	\$
Capital Expenditure Funding																	
DLA Grant Funding	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$
EDA Grant Funding	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Subtotal - Capital Expenditure Funding	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Capital Expenditure Debt Financing Required	\$	-	\$	-	\$	8,335,250	\$	8,335,250	\$	4,099,344	\$	4,099,330	\$	4,099,326	\$	3,434,750	\$

- \$	- \$	- \$	- \$	- \$	- \$	1,333,333 \$	2,050,000 \$	2,050,000
- \$	- \$	- \$	- \$	- \$	- \$	2,700,000 \$	4,450,000 \$	4,450,000
433,333 \$	433,334 \$	- \$	433,333 \$	433,333 \$	433,334 \$	1,950,000 \$	4,401,666 \$	6,135,000
- \$	- \$	- \$	- \$	- \$	- \$	100,000 \$	100,000 \$	100,000
- \$	- \$	- \$	- \$	- \$	- \$	200,000 \$	200,000 \$	200,000
- \$	- \$	- \$	- \$	- \$	- \$	700,000 \$	850,000 \$	850,000
- \$	- \$	- \$	- \$	- \$	- \$	2,266,667 \$	2,800,000 \$	2,900,000
- \$	- \$	- \$	- \$	- \$	- \$	2,500,000 \$	3,750,000 \$	3,750,000
- \$	- \$	- \$	- \$	- \$	- \$	400,000 \$	450,000 \$	450,000
- \$	- \$	- \$	- \$	- \$	- \$	2,066,667 \$	2,200,000 \$	2,200,000
- \$	- \$	- \$	- \$	- \$	- \$	366,667 \$	400,000 \$	400,000
- \$	- \$	- \$	- \$	- \$	- \$	50,000 \$	50,000 \$	50,000
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
- \$	- \$	- \$	- \$	- \$	- \$	8,650,001 \$	10,800,000 \$	10,800,000
- \$	- \$	- \$	- \$	- \$	- \$	1,950,000 \$	1,950,000 \$	1,950,000
- \$	- \$	- \$	- \$	- \$	- \$	613,334 \$	920,000 \$	920,000
- \$	- \$	- \$	- \$	- \$	- \$	633,334 \$	1,900,000 \$	1,900,000
266,667 \$	266,667 \$	- \$	- \$	- \$	- \$	- \$	1,333,333 \$	1,600,000
100,000 \$	100,000 \$	- \$	- \$	- \$	- \$	- \$	200,000 \$	300,000
366,667 \$	366,667 \$	- \$	- \$	- \$	- \$	3,196,668 \$	6,303,333 \$	6,670,000
950,000 \$	950,000 \$	925,000 \$	800,000 \$	800,000 \$	800,000 \$	22,570,005 \$	34,546,666 \$	38,755,000
95,000 \$	95,000 \$	92,500 \$	80,000 \$	80,000 \$	80,000 \$	2,257,001 \$	3,454,667 \$	3,875,500
1,045,000 \$	1,045,000 \$	1,017,500 \$	880,000 \$	880,000 \$	880,000 \$	24,827,006 \$	38,001,333 \$	42,630,500
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
1,045,000 \$	1,045,000 \$	1,017,500 \$	880,000 \$	880,000 \$	880,000 \$	24,827,006 \$	38,001,333 \$	42,630,500

Table B.4. Debt service, Memphis Defense Depot.

Annual Debt Service Calculations
Memphis Defense Depot

Scenario: DDMT Recast

		Year 1 1999	Year 2 2000	Year 3 2001	Year 4 2002	Year 5 2003	Year 6 2004	Year 7 2005	Year 8 2006	Year 9 2007	Year 10 2008
1 Capital Budget and Cum Neg Cash Flow	\$	-	\$ 8,335,250	\$ 8,335,250	\$ 4,099,344	\$ 4,099,330	\$ 4,099,326	\$ 3,434,750	\$ 3,434,750	\$ 1,045,000	\$ 1,045,000
2 Less Funds Applied	2.5% \$	-	-	-	-	-	-	-	-	-	-
3 Plus Debt Service Placement Costs	6.00% \$	-	\$ 500,115	\$ 500,115	\$ 245,961	\$ 245,960	\$ 245,960	\$ 206,065	\$ 206,065	\$ 62,700	\$ 62,700
4 Principal Borrowed	0%	-	\$ 8,835,365	\$ 8,835,365	\$ 4,345,304	\$ 4,345,290	\$ 4,345,286	\$ 3,640,835	\$ 3,640,835	\$ 1,107,700	\$ 1,107,700
5											
6 Interest Rate ²	7.0%										
7 Term	20										
8 Annual Debt Service (Principal + Interest) ⁴	0.094393										
9											
10 Year	1	-									
11	2	-	833,996								
12	3	-	833,996	833,996							
13	4	-	833,996	833,996	410,166						
14	5	-	833,996	833,996	410,166	410,165					
15	6	-	833,996	833,996	410,166	410,165	410,164				
16	7	-	833,996	833,996	410,166	410,165	410,164	343,669			
17	8	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669		
18	9	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	
19	10	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
20	11	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
21	12	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
22	13	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
23	14	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
24	15	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
25	16	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
26	17	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
27	18	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
28	19	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
29	20	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
30	21	-	833,996	833,996	410,166	410,165	410,164	343,669	343,669	104,559	104,559
31	22	-			410,166	410,165	410,164	343,669	343,669	104,559	104,559
32	23	-				410,165	410,164	343,669	343,669	104,559	104,559
33	24	-					410,164	343,669	343,669	104,559	104,559
34	25	-						343,669	343,669	104,559	104,559
35	26	-							343,669	104,559	104,559
36	27	-								104,559	104,559
37	28	-									104,559
38	29	-									
39	30	-									
40	31	-									
41	32	-									
42	33	-									
43	34	-									
44											
45 TOTALS	\$	-	\$ 16,670,610	\$ 16,670,610	\$ 8,203,320	\$ 8,203,293	\$ 8,203,284	\$ 6,873,361	\$ 6,873,361	\$ 2,091,181	\$ 2,091,181
46 Principal	\$	-	\$ 8,835,365	\$ 8,835,365	\$ 4,345,304	\$ 4,345,290	\$ 4,345,286	\$ 3,640,835	\$ 3,640,835	\$ 1,107,700	\$ 1,107,700

Scenario: DDMT Recast

[illegible]

Table B.5. DDMT Business Plan Pro Forma Recast.

15-Year Pro Forma Analysis
Memphis Defense Depot

Scenario: DDMT Recast

	Year 1 1999	Year 2 2000	Year 3 2001	Year 4 2002	Year 5 2003	Year 6 2004	Year 7 2005	
1 DEVELOPMENT YEAR								
2								
3 REVENUES FROM REAL ESTATE ACTIVITY								
4 Lease Revenues	\$ 938,058	\$ 1,919,955	\$ 2,601,841	\$ 3,604,092	\$ 4,182,395	\$ 4,942,826	\$ 5,125,755	5
Land Sales	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
## Other Revenues	\$ 97,000	\$ 97,000	\$ 97,000	\$ 97,000	\$ 97,000	\$ 50,000	\$ 50,000	
CAM Fees	\$ 112,567	\$ 211,786	\$ 287,807	\$ 397,719	\$ 473,715	\$ 564,853	\$ 581,329	
OEAF Funding	\$ 290,100	\$ 201,600	\$ 134,400	\$ 67,200	\$ -	\$ -	\$ -	
# DLA Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
## Total Revenues	\$ 1,437,725	\$ 2,430,341	\$ 3,121,047	\$ 4,166,010	\$ 4,753,109	\$ 5,557,678	\$ 5,757,084	5
## EXPENDITURES								
Administration	\$ 377,000	\$ 400,000	\$ 400,000	\$ 450,000	\$ 450,000	\$ 450,000	\$ 400,000	
## Marketing	\$ -	\$ 125,000	\$ 125,000	\$ 125,000	\$ 150,000	\$ 150,000	\$ 150,000	
## Commissions	\$ -	\$ 188,900	\$ 196,900	\$ 150,700	\$ 218,200	\$ 150,800	\$ 203,400	
## Building Maintenance - Unoccupied Buildings	\$ -	\$ -	\$ 1,780,172	\$ 1,425,856	\$ 1,194,702	\$ 917,491	\$ 867,375	
## Common Area maintenance/Security	\$ -	\$ 112,567	\$ 211,786	\$ 287,807	\$ 397,719	\$ 564,853	\$ 581,329	2
## Total Expense	\$ 803,467	\$ 933,686	\$ 2,723,878	\$ 2,641,778	\$ 2,419,217	\$ 2,285,743	\$ 2,143,204	
## Net Operating Income	\$ 634,258	\$ 1,496,655	\$ 397,369	\$ 1,524,235	\$ 2,333,893	\$ 3,271,935	\$ 3,613,881	3
## INFRASTRUCTURE COSTS								
## Infrastructure Improvements	\$ -	\$ 8,335,250.00	\$ 8,335,250.00	\$ 4,099,343.60	\$ 4,099,330.40	\$ 4,099,326.00	\$ 3,434,750.00	3,43
Infrastructure and Placement Costs Financed	\$ -	\$ 8,335,365.00	\$ 8,335,365.00	\$ 4,345,304.22	\$ 4,345,290.22	\$ 4,345,285.56	\$ 3,640,835.00	3,64
## Debt Service								
## Principal Payments	\$ -	\$ 215,520	\$ 446,127	\$ 583,351	\$ 730,180	\$ 887,287	\$ 1,038,207	1
Interest Expense	\$ -	\$ 618,476	\$ 1,221,865	\$ 1,494,807	\$ 1,758,143	\$ 2,011,200	\$ 2,203,949	2
Subtotal - Debt Service	\$ -	\$ 833,996	\$ 1,667,992	\$ 2,078,158	\$ 2,488,323	\$ 2,898,487	\$ 3,242,156	3
## Cash Flow after Debt Service	\$ 634,258.00	\$ 662,658.55	\$ (1,270,623.02)	\$ (553,922.82)	\$ (164,429.98)	\$ 373,448.19	\$ 371,724.78	28:
## Cumulative Cash Flow	\$ 634,258	\$ 1,296,917	\$ 26,294	\$ (527,629)	\$ (682,059)	\$ (308,611)	\$ 63,114	
## Less Cash Flow Applied To Capital Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
## Net Cumulative Cash Flow	\$ 634,258	\$ 1,296,917	\$ 26,294	\$ (527,629)	\$ (682,059)	\$ (308,611)	\$ 63,114	
## Cash Flow From Operations - Current Year	\$ 634,258	\$ 1,296,917	\$ 26,294	\$ (527,629)	\$ (682,059)	\$ (308,611)	\$ 63,114	
## DISCOUNTED CASH FLOWS @ 16%	\$ 537,607	\$ 476,911	\$ (773,340)	\$ (285,707)	\$ (67,603)	\$ 138,337	\$ 116,694	
## PRESENT VALUE OF CASH FLOWS	\$ 1,135,449							
## YEAR-15 RESIDUAL	\$ 355,064							
## INDICATED BUSINESS PLAN VALUE	\$ 1,490,513							
## DISCOUNTED CASH FLOWS @ 15%	\$ 551,529	\$ 501,065	\$ (635,455)	\$ (316,707)	\$ (78,779)	\$ 161,452	\$ 139,745	
## PRESENT VALUE OF CASH FLOWS	\$ 1,471,912							
## YEAR-15 RESIDUAL	\$ 1,318,544							
## INDICATED BUSINESS PLAN VALUE	\$ 2,790,457							

Assumptions:

- (1) Recast of LRA's numbers as closely as possible
 (2) Cumulative cash flow in excess of @ \$500,000-\$600,000 applied to infrastructure costs and/or remaining debt annually
 (3) Residual value at end of year 15, including remaining debt, discounted to present value

Scenario: DDMT Recast

Year 3 2001	Year 4 2002	Year 5 2003	Year 6 2004	Year 7 2005	Year 8 2006	Year 9 2007	Year 10 2008	Year 11 2009	Year 12 2010	Year 13 2011	Year 14 2012	
2,601,841 \$	3,604,092 \$	4,182,395 \$	4,942,826 \$	5,125,755 \$	5,303,204 \$	5,486,505 \$	5,662,061 \$	5,840,631 \$	6,008,636 \$	6,176,641 \$	6,291,659 \$	6,55-
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	56
97,000 \$	97,000 \$	97,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	74
287,807 \$	397,719 \$	473,715 \$	564,853 \$	581,329 \$	600,126 \$	615,533 \$	634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	74
134,400 \$	67,200 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
3,121,047 \$	4,166,010 \$	4,753,109 \$	5,557,678 \$	5,757,084 \$	5,953,329 \$	6,152,038 \$	6,346,393 \$	6,541,122 \$	6,732,886 \$	6,924,650 \$	7,052,867 \$	7,35
400,000 \$	450,000 \$	450,000 \$	450,000 \$	400,000 \$	400,000 \$	350,000 \$	350,000 \$	300,000 \$	300,000 \$	300,000 \$	275,000 \$	27
125,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	100,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	5
150,700 \$	218,200 \$	150,800 \$	203,400 \$	144,500 \$	118,400 \$	156,500 \$	118,400 \$	158,800 \$	73,400 \$	70,500 \$	60,800 \$	8
1,760,172 \$	1,425,856 \$	1,194,702 \$	917,491 \$	867,375 \$	810,202 \$	763,338 \$	706,158 \$	657,007 \$	584,741 \$	512,475 \$	472,327 \$	36
287,807 \$	397,719 \$	473,715 \$	564,853 \$	581,329 \$	600,126 \$	615,533 \$	634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	74
2,723,678 \$	2,641,778 \$	2,419,217 \$	2,285,743 \$	2,143,204 \$	2,078,727 \$	1,985,371 \$	1,868,890 \$	1,816,298 \$	1,682,391 \$	1,630,983 \$	1,569,335 \$	1,52
397,369 \$	1,524,235 \$	2,333,893 \$	3,271,935 \$	3,613,881 \$	3,874,602 \$	4,166,667 \$	4,487,503 \$	4,724,824 \$	5,050,495 \$	5,293,667 \$	5,483,532 \$	5,82
3,335,250.00 \$	4,099,343.60 \$	4,099,330.40 \$	4,099,326.00 \$	3,434,750.00 \$	3,434,750.00 \$	1,045,000.00 \$	1,045,000.00 \$	1,045,000.00 \$	1,017,500.00 \$	880,000.00 \$	880,000.00 \$	880.0
3,835,365.00 \$	4,345,304.22 \$	4,345,290.22 \$	4,345,285.56 \$	3,640,835.00 \$	3,640,835.00 \$	1,107,700.00 \$	1,107,700.00 \$	1,107,700.00 \$	1,078,560.00 \$	932,800.00 \$	932,800.00 \$	932.8
448,127 \$	583,351 \$	730,180 \$	887,287 \$	1,038,207 \$	1,199,692 \$	1,310,691 \$	1,429,459 \$	1,556,541 \$	1,691,808 \$	1,832,989 \$	1,984,052 \$	2,14
1,221,865 \$	1,494,807 \$	1,758,143 \$	2,011,200 \$	2,203,949 \$	2,386,133 \$	2,379,693 \$	2,365,484 \$	2,342,961 \$	2,309,501 \$	2,256,371 \$	2,193,357 \$	2,11
1,667,992 \$	2,078,158 \$	2,488,323 \$	2,896,487 \$	3,242,156 \$	3,585,825 \$	3,690,384 \$	3,794,943 \$	3,899,502 \$	4,001,310 \$	4,089,359 \$	4,177,409 \$	4,26
1,270,623.02	(563,922.82)	(184,429.98)	373,448.19	371,724.78	288,776.82	476,283.00	692,560.14	826,321.94	1,049,186.73	1,204,307.29	1,306,123.08	1,564.4
26,294 \$	(627,629) \$	(682,059) \$	(308,611) \$	63,114 \$	351,891 \$	828,174 \$	1,620,734 \$	2,346,056 \$	3,395,241 \$	4,599,549 \$	5,905,672 \$	7,47
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
26,294 \$	(627,629) \$	(682,059) \$	(308,611) \$	63,114 \$	351,891 \$	828,174 \$	1,620,734 \$	2,346,056 \$	3,395,241 \$	4,599,549 \$	5,905,672 \$	7,47
(773,340) \$	(285,707) \$	(67,603) \$	138,337 \$	116,694 \$	76,826 \$	107,381 \$	132,324 \$	133,635 \$	143,969 \$	140,046 \$	128,717 \$	13
(838,455) \$	(316,707) \$	(76,779) \$	161,452 \$	139,745 \$	94,402 \$	135,389 \$	171,190 \$	177,397 \$	196,100 \$	195,734 \$	184,593 \$	19

2

Year 10 2008	Year 11 2009	Year 12 2010	Year 13 2011	Year 14 2012	Year 15 2013	Cumulative Forecast		
						5 Year Total	10 Year Total	15 year Total
5,662,061 \$	5,840,631 \$	6,008,636 \$	6,176,641 \$	6,291,659 \$	6,556,015 \$	13,246,339	39,766,689	70,640,271
- \$	- \$	- \$	- \$	- \$	- \$	-	-	-
50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	485,000	735,000	985,000
634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526 \$	1,483,693	4,479,766	7,969,249
- \$	- \$	- \$	- \$	- \$	- \$	693,300	693,300	693,300
- \$	- \$	- \$	- \$	- \$	- \$	-	-	-
6,346,393 \$	6,541,122 \$	6,732,886 \$	6,924,650 \$	7,052,867 \$	7,351,541 \$	18,908,232	48,674,764	80,277,820
350,000 \$	300,000 \$	300,000 \$	300,000 \$	275,000 \$	275,000 \$	2,180,000	3,960,000	5,100,000
50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	675,000	1,275,000	1,825,000
118,400 \$	158,800 \$	73,400 \$	70,500 \$	60,800 \$	83,200 \$	908,800	1,648,700	2,083,400
706,198 \$	657,007 \$	584,741 \$	512,475 \$	472,327 \$	367,943 \$	4,380,730	8,448,293	11,039,785
634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526 \$	1,483,693	4,479,766	7,969,249
1,868,990 \$	1,816,298 \$	1,682,391 \$	1,630,983 \$	1,569,335 \$	1,521,688 \$	9,621,823	19,873,768	28,094,434
4,487,503 \$	4,724,824 \$	5,050,495 \$	5,293,667 \$	5,483,532 \$	5,829,872 \$	6,386,409	28,800,996	52,183,386
045,000.00 \$	1,045,000.00 \$	1,017,500.00 \$	880,000.00 \$	880,000.00 \$	880,000.00 \$	24,869,174 \$	37,928,000 \$	42,630,500 \$
107,700.00 \$	1,107,700.00 \$	1,078,550.00 \$	932,800.00 \$	932,800.00 \$	932,800.00 \$	26,361,324 \$	40,203,680 \$	45,188,330 \$
1,429,459 \$	1,556,541 \$	1,691,808 \$	1,832,989 \$	1,984,052 \$	2,145,689 \$	1,975,178 \$	7,840,514 \$	17,051,593 \$
2,365,484 \$	2,342,961 \$	2,309,501 \$	2,256,371 \$	2,193,357 \$	2,119,770 \$	5,093,290 \$	16,439,748 \$	27,661,708 \$
3,794,943 \$	3,899,502 \$	4,001,310 \$	4,089,359 \$	4,177,409 \$	4,265,459 \$	7,068,468 \$	24,280,263 \$	44,713,301 \$
692,660.14	825,321.94	1,049,186.73	1,204,307.29	1,306,123.08	1,564,413.34	(682,059) \$	1,520,734 \$	7,470,085 \$
1,520,734 \$	2,346,066 \$	3,395,241 \$	4,599,549 \$	5,905,672 \$	7,470,085 \$	(682,059) \$	1,520,734 \$	7,470,085 \$
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
1,520,734 \$	2,346,066 \$	3,395,241 \$	4,599,549 \$	5,905,672 \$	7,470,085 \$	-	-	-
1,520,734 \$	2,346,066 \$	3,395,241 \$	4,599,549 \$	5,905,672 \$	7,470,085 \$	-	-	-
132,324 \$	133,635 \$	143,969 \$	140,046 \$	128,717 \$	130,654 \$	32,388,178		
						28,136,737		
						358,064		
171,190 \$	177,397 \$	196,100 \$	195,734 \$	184,593 \$	192,258 \$	38,865,813		
						28,136,737		
						1,318,544		

3

Table B.6. CERL1 Business Plan Pro Forma Summary.

15-Year Pro Forma Analysis
Memphis Defense Depot

Scenario: CERL 1 w/o Land Sale

	Year 1 1999	Year 2 2000	Year 3 2001	Year 4 2002	Year 5 2003	Year 6 2004	Year 7 2005
1 DEVELOPMENT YEAR							
2 REVENUES FROM REAL ESTATE ACTIVITY							
4 Lease Revenues	\$ -	\$ 1,512,561	\$ 2,459,779	\$ 3,604,092	\$ 4,182,395	\$ 4,942,826	\$ 5,125,755
Land Sales	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
## Other Revenues	\$ 97,000	\$ 97,000	\$ 97,000	\$ 97,000	\$ 97,000	\$ 50,000	\$ 50,000
CAM Fees	\$ -	\$ 99,219	\$ 231,523	\$ 397,719	\$ 473,715	\$ 564,852	\$ 581,329
CEA Funding	\$ 290,100	\$ 201,600	\$ 134,400	\$ 67,200	\$ -	\$ -	\$ -
DLA Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
## Total Revenues	\$ 387,100	\$ 1,910,380	\$ 2,922,702	\$ 4,166,010	\$ 4,753,109	\$ 5,557,678	\$ 5,757,084
## EXPENDITURES							
Administration	\$ 377,000	\$ 400,000	\$ 400,000	\$ 450,000	\$ 450,000	\$ 450,000	\$ 400,000
Marketing	\$ -	\$ 125,000	\$ 125,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Commissions	\$ -	\$ 188,900	\$ 196,900	\$ 150,700	\$ 218,200	\$ 203,400	\$ 144,500
Building Maintenance - Unoccupied Buildings	\$ -	\$ -	\$ 1,931,367	\$ 1,425,856	\$ 1,194,702	\$ 917,491	\$ 867,375
Common Area maintenance/Security	\$ -	\$ 99,219	\$ 231,523	\$ 397,719	\$ 473,715	\$ 564,852	\$ 581,329
## Total Expense	\$ 690,900	\$ 821,119	\$ 2,838,591	\$ 2,641,778	\$ 2,419,217	\$ 2,285,743	\$ 2,143,204
## Net Operating Income	\$ (303,800)	\$ 1,089,261	\$ 84,112	\$ 1,524,235	\$ 2,333,893	\$ 3,271,935	\$ 3,613,880
## INFRASTRUCTURE COSTS							
## Infrastructure Improvements	\$ -	\$ 6,683,330.66	\$ 6,683,330.66	\$ 3,720,330.23	\$ 3,720,330.23	\$ 3,720,330.23	\$ 3,599,110.00
Infrastructure and Placement Costs Financed	\$ -	\$ 7,084,330.49	\$ 7,084,330.49	\$ 3,943,550.04	\$ 3,943,550.04	\$ 3,943,550.04	\$ 3,815,056.60
## Debt Service							
## Principal Payments	\$ -	\$ 172,808	\$ 357,712	\$ 478,946	\$ 608,667	\$ 747,469	\$ 892,852
Interest Expense	\$ -	\$ 495,903	\$ 979,710	\$ 1,230,718	\$ 1,473,241	\$ 1,706,683	\$ 1,921,414
Subtotal - Debt Service	\$ -	\$ 668,711	\$ 1,337,421	\$ 1,709,665	\$ 2,081,908	\$ 2,454,151	\$ 2,814,265
## Cash Flow after Debt Service	\$ (303,800.00)	\$ 420,550.32	\$ (1,253,308.57)	\$ (185,429.53)	\$ 251,984.74	\$ 817,783.60	\$ 799,614.91
## Cumulative Cash Flow	\$ (303,800)	\$ 116,750	\$ (1,136,559)	\$ (1,321,989)	\$ (1,070,004)	\$ (252,220)	\$ 547,394
## Less Cash Flow Applied To Capital Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
## Net Cumulative Cash Flow	\$ (303,800)	\$ 116,750	\$ (1,136,559)	\$ (1,321,989)	\$ (1,070,004)	\$ (252,220)	\$ 547,394
## Cash Flow From Operations - Current Year	\$ (303,800)	\$ 116,750	\$ (1,136,559)	\$ (1,321,989)	\$ (1,070,004)	\$ (252,220)	\$ 547,394
## DISCOUNTED CASH FLOWS @ 16%	\$ (261,897)	\$ 312,537	\$ (802,942)	\$ (102,411)	\$ 119,973	\$ 335,663	\$ 282,927
## PRESENT VALUE OF CASH FLOWS	\$ 1,761,798						
## YEAR-15 RESIDUAL	\$ 1,406,478						
## INDICATED BUSINESS PLAN VALUE	\$ 3,167,277						
## DISCOUNTED CASH FLOWS @ 13%	\$ (268,860)	\$ 329,363	\$ (868,606)	\$ (113,727)	\$ 136,767	\$ 392,797	\$ 339,886
## PRESENT VALUE OF CASH FLOWS	\$ 2,494,805						
## YEAR-15 RESIDUAL	\$ 3,426,612						
## INDICATED BUSINESS PLAN VALUE	\$ 5,921,416						

Assumptions:

- [1] CERL 1 infrastructure numbers with 30% contingency, based on CERL's need and extent analysis
- [2] Removes McCauley lease and assumes their space is leased 50% in Year 2, 75% in Year 3 and 100% in Year 4.
- [3] Residual value at end of year 15, including remaining debt, discounted to present value

Scenario: CERL 1 w/o Land Sales

Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
779 \$	3,604,082 \$	4,182,395 \$	4,942,826 \$	5,125,755 \$	5,303,203 \$	5,486,504 \$	5,662,060 \$	5,840,631 \$	6,008,636 \$	6,176,641 \$	6,291,659 \$	6,558,014 \$
000 \$	97,000 \$	97,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$
523 \$	397,719 \$	473,715 \$	564,852 \$	581,329 \$	600,126 \$	615,533 \$	634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526 \$
400 \$	67,200 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
702 \$	4,166,010 \$	4,753,109 \$	5,557,678 \$	5,757,084 \$	5,953,329 \$	6,152,037 \$	6,346,392 \$	6,541,122 \$	6,732,886 \$	6,924,650 \$	7,052,867 \$	7,351,540 \$
300 \$	450,000 \$	450,000 \$	450,000 \$	400,000 \$	400,000 \$	350,000 \$	350,000 \$	300,000 \$	300,000 \$	300,000 \$	275,000 \$	275,000 \$
300 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	100,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$
700 \$	218,200 \$	150,800 \$	203,400 \$	144,500 \$	118,400 \$	156,500 \$	118,400 \$	158,800 \$	73,400 \$	70,500 \$	80,800 \$	83,200 \$
367 \$	1,425,856 \$	1,194,702 \$	917,491 \$	867,375 \$	810,202 \$	763,338 \$	706,158 \$	657,007 \$	584,741 \$	512,475 \$	472,327 \$	367,943 \$
323 \$	397,719 \$	473,715 \$	564,852 \$	581,329 \$	600,126 \$	615,533 \$	634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526 \$
591 \$	2,641,776 \$	2,419,217 \$	2,288,743 \$	2,143,204 \$	2,078,728 \$	1,988,371 \$	1,868,890 \$	1,816,298 \$	1,682,391 \$	1,630,983 \$	1,569,335 \$	1,521,669 \$
112 \$	1,524,235 \$	2,333,893 \$	3,271,935 \$	3,613,880 \$	3,874,601 \$	4,166,667 \$	4,487,503 \$	4,724,824 \$	5,050,495 \$	5,293,666 \$	5,483,532 \$	5,829,872 \$
66 \$	3,720,330.23 \$	3,720,330.23 \$	3,720,330.23 \$	3,599,110.00 \$	3,599,110.00 \$	1,239,172.00 \$	1,239,172.00 \$	1,239,172.00 \$	581,786.00 \$	- \$	- \$	- \$
49 \$	3,943,550.04 \$	3,943,550.04 \$	3,943,550.04 \$	3,815,056.60 \$	3,815,056.60 \$	1,313,522.32 \$	1,313,522.32 \$	1,313,522.32 \$	616,693.16 \$	- \$	- \$	- \$
12 \$	478,946 \$	608,667 \$	747,469 \$	892,852 \$	1,048,412 \$	1,153,841 \$	1,266,651 \$	1,387,357 \$	1,499,515 \$	1,604,481 \$	1,716,795 \$	1,836,970 \$
10 \$	1,230,718 \$	1,473,241 \$	1,706,683 \$	1,921,414 \$	2,125,968 \$	2,144,526 \$	2,155,703 \$	2,158,984 \$	2,105,038 \$	2,000,072 \$	1,887,758 \$	1,767,583 \$
21 \$	1,709,685 \$	2,081,908 \$	2,454,151 \$	2,814,265 \$	3,174,380 \$	3,298,367 \$	3,422,354 \$	3,548,341 \$	3,604,553 \$	3,604,553 \$	3,604,553 \$	3,604,553 \$
57) (185,429.83)	251,984.74	817,783.80	799,814.91	700,221.86	868,299.67	1,065,148.64	1,178,482.27	1,445,942.08	1,689,113.36	1,878,978.87	2,225,318.85	
59) (1,321,989)	(1,070,004)	(252,220)	647,394	1,247,616	2,116,916	3,181,064	4,359,547	5,805,489	7,494,602	9,373,581	11,568,900	
59) (1,321,989)	(1,070,004)	(252,220)	647,394	1,247,616	2,116,916	3,181,064	4,359,547	5,805,489	7,494,602	9,373,581	11,568,900	
42) (102,411)	119,873	335,653	282,927	213,685	228,322	241,452	230,295	243,688	246,304	235,239	240,172	
06) (113,727)	136,767	392,797	339,886	263,395	289,044	313,780	307,228	333,587	344,857	339,487	355,808	

Year 10 2008	Year 11 2009	Year 12 2010	Year 13 2011	Year 14 2012	Year 15 2013	Cumulative Forecast		
						5 Year Total	10 Year Total	15 year Total
5,662,060 \$	5,840,631 \$	6,008,636 \$	6,176,641 \$	6,291,659 \$	6,556,014	11,758,826	38,279,175	69,152,756
- \$	- \$	- \$	- \$	- \$	- \$	-	-	-
50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000	485,000	735,000	985,000
634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526	1,202,176	4,198,348	7,677,831
- \$	- \$	- \$	- \$	- \$	- \$	693,300	693,300	693,300
- \$	- \$	- \$	- \$	- \$	- \$	-	-	-
6,346,392 \$	6,541,122 \$	6,732,886 \$	6,924,650 \$	7,052,867 \$	7,351,540	14,139,302	43,905,823	78,508,887
350,000 \$	300,000 \$	300,000 \$	300,000 \$	275,000 \$	275,000	2,150,000	3,950,000	5,100,000
50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000	675,000	1,275,000	1,825,000
118,400 \$	158,800 \$	73,400 \$	70,500 \$	80,800 \$	83,200	908,500	1,648,700	2,093,400
706,158 \$	657,007 \$	584,741 \$	512,475 \$	472,327 \$	367,943	4,561,926	8,616,498	11,210,681
634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526	1,202,176	4,198,348	7,677,831
1,868,890 \$	1,816,298 \$	1,682,391 \$	1,630,983 \$	1,589,336 \$	1,621,669	9,411,602	19,763,537	27,984,212
4,487,503 \$	4,724,824 \$	5,050,495 \$	5,293,666 \$	5,483,532 \$	5,829,872	4,727,700	24,142,286	50,524,676
1,239,172.00 \$	1,239,172.00 \$	581,786.00 \$	- \$	- \$	- \$	20,807,322 \$	34,204,216 \$	36,025,174 \$
1,313,522.32 \$	1,313,522.32 \$	616,693.16 \$	- \$	- \$	- \$	22,065,761 \$	36,256,469 \$	38,186,684 \$
1,266,651 \$	1,387,357 \$	1,499,515 \$	1,604,481 \$	1,716,795 \$	1,836,970	1,618,132 \$	6,727,356 \$	14,772,474 \$
2,155,703 \$	2,158,984 \$	2,105,038 \$	2,000,072 \$	1,987,758 \$	1,767,583	4,179,672 \$	14,233,866 \$	24,183,301 \$
3,422,354 \$	3,546,341 \$	3,604,553 \$	3,604,553 \$	3,604,553 \$	3,604,553	5,797,704 \$	20,981,222 \$	38,925,776 \$
1,086,148.64	1,178,482.27	1,445,942.08	1,689,113.36	1,878,978.87	2,225,318.85	(1,070,004) \$	3,181,064 \$	11,598,900
3,181,064 \$	4,369,547 \$	5,805,489 \$	7,494,602 \$	9,373,581 \$	11,598,900	(1,070,004) \$	3,181,064 \$	11,598,900
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$
3,181,064 \$	4,369,547 \$	5,805,489 \$	7,494,602 \$	9,373,581 \$	11,598,900	-	-	-
3,181,064 \$	4,369,547 \$	5,805,489 \$	7,494,602 \$	9,373,581 \$	11,598,900	-	-	-
241,452 \$	230,296 \$	243,688 \$	245,304 \$	235,239 \$	240,172	36,436,698		
						23,414,210		
						1,405,478		
313,780 \$	307,228 \$	333,687 \$	344,857 \$	339,487 \$	355,808	44,846,167		
						23,414,210		
						3,426,612		

Table B.7. CERL1 Business Plan Pro Forma Summary.

15-Year Pro Forma Analysis
Memphis Defense Depot

Scenario: CERL 2 w/ Land Sale

	Year 1 1999	Year 2 2000	Year 3 2001	Year 4 2002	Year 5 2003	Year 6 2004	Year 7 2005
1 DEVELOPMENT YEAR							
2							
3 REVENUES FROM REAL ESTATE ACTIVITY							
4 Lease Revenues	\$ -	\$ 1,512,561	\$ 2,459,779	\$ 3,604,092	\$ 4,182,395	\$ 4,942,826	\$ 5,125,755
Land Sales	\$ -	\$ -	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000
## Other Revenues	\$ 97,000	\$ 97,000	\$ 97,000	\$ 97,000	\$ 97,000	\$ 50,000	\$ 50,000
CAM Fees	\$ -	\$ 99,219	\$ 231,523	\$ 397,719	\$ 473,715	\$ 564,852	\$ 581,329
OEA Funding	\$ 290,100	\$ 201,600	\$ 134,400	\$ 67,200	\$ -	\$ -	\$ -
## DLA Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
## Total Revenues	\$ 387,100	\$ 1,910,380	\$ 3,272,702	\$ 4,516,010	\$ 5,103,109	\$ 5,907,678	\$ 6,107,084
## EXPENDITURES							
Administration	\$ 377,000	\$ 400,000	\$ 400,000	\$ 450,000	\$ 450,000	\$ 450,000	\$ 400,000
## Marketing	\$ -	\$ 125,000	\$ 125,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
## Commissions	\$ -	\$ 188,900	\$ 196,900	\$ 150,700	\$ 218,200	\$ 203,400	\$ 144,500
## Building Maintenance - Unoccupied Buildings	\$ -	\$ -	\$ 1,931,367	\$ 1,425,856	\$ 1,194,702	\$ 917,491	\$ 867,375
## Common Area Maintenance/Security	\$ -	\$ 99,219	\$ 231,523	\$ 397,719	\$ 473,715	\$ 564,852	\$ 581,329
## Total Expense	\$ 690,900	\$ 821,119	\$ 2,838,591	\$ 2,641,776	\$ 2,419,217	\$ 2,285,743	\$ 2,143,204
## Net Operating Income	\$ (303,800)	\$ 1,089,261	\$ 434,112	\$ 1,874,235	\$ 2,683,893	\$ 3,621,935	\$ 3,963,880
## INFRASTRUCTURE COSTS							
## Infrastructure Improvements	\$ -	\$ 6,683,330.66	\$ 6,683,330.66	\$ 3,720,330.23	\$ 3,720,330.23	\$ 3,720,330.23	\$ 3,599,110.00
Infrastructure and Placement Costs Financed	\$ -	\$ 7,084,330.49	\$ 7,084,330.49	\$ 3,943,550.04	\$ 3,943,550.04	\$ 3,943,550.04	\$ 3,815,056.60
## Debt Service							
Principal Payments	\$ -	\$ 172,808	\$ 357,712	\$ 478,946	\$ 606,667	\$ 747,469	\$ 892,832
Interest Expense	\$ -	\$ 495,903	\$ 979,710	\$ 1,230,718	\$ 1,473,241	\$ 1,706,683	\$ 1,921,414
Subtotal - Debt Service	\$ -	\$ 668,711	\$ 1,337,421	\$ 1,709,665	\$ 2,081,908	\$ 2,454,151	\$ 2,814,265
## Cash Flow after Debt Service	\$ (303,800.00)	\$ 420,550.32	\$ (903,309.57)	\$ 164,570.47	\$ 601,984.74	\$ 1,167,783.80	\$ 1,149,614.91
## Cumulative Cash Flow	\$ (303,800)	\$ 116,750	\$ (786,559)	\$ (621,989)	\$ (20,004)	\$ 1,147,780	\$ 2,297,394
## Less Cash Flow Applied To Capital Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
## Net Cumulative Cash Flow	\$ (303,800)	\$ 116,750	\$ (786,559)	\$ (621,989)	\$ (20,004)	\$ 1,147,780	\$ 2,297,394
## Cash Flow From Operations - Current Year	\$ (303,800)	\$ 116,750	\$ (786,559)	\$ (621,989)	\$ (20,004)	\$ 1,147,780	\$ 2,297,394
## DISCOUNTED CASH FLOWS @ 16%	\$ (261,897)	\$ 312,837	\$ (578,712)	\$ 90,891	\$ 286,613	\$ 479,308	\$ 406,768
## PRESENT VALUE OF CASH FLOWS	\$ 3,181,377						
## YEAR-15 RESIDUAL	\$ 1,641,589						
## INDICATED BUSINESS PLAN VALUE	\$ 4,792,946						
## DISCOUNTED CASH FLOWS @ 13%	\$ (268,850)	\$ 329,353	\$ (626,039)	\$ 100,934	\$ 326,733	\$ 560,908	\$ 488,656
## PRESENT VALUE OF CASH FLOWS	\$ 4,172,801						
## YEAR-15 RESIDUAL	\$ 3,857,087						
## INDICATED BUSINESS PLAN VALUE	\$ 8,029,888						

Assumptions:

- [1] CERL 1 Infrastructure numbers with 30% contingency, based on CERL'S need and extent analysis
- [2] Removes McCauley lease and assumes their space is leased 50% in Year 2, 75% in Year 3 and 100% in Year 4.
- [3] Residual value at end of year 15, including remaining debt, discounted to present value
- [4] Land sales of \$350,000 annually beginning in Year 3 (10 acres/year @ \$35,000/acre)

Scenario: CERL 2 w/ Land Sales

Year 3 2001	Year 4 2002	Year 5 2003	Year 6 2004	Year 7 2005	Year 8 2006	Year 9 2007	Year 10 2008	Year 11 2009	Year 12 2010	Year 13 2011	Year 14 2012	
459,779 \$	3,604,092 \$	4,182,395 \$	4,942,826 \$	5,125,755 \$	5,303,203 \$	5,486,504 \$	5,662,060 \$	5,840,631 \$	6,008,636 \$	6,176,841 \$	6,291,659 \$	6,556
350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350
97,000 \$	97,000 \$	97,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50
231,523 \$	397,719 \$	473,715 \$	564,852 \$	581,329 \$	600,126 \$	615,533 \$	634,332 \$	650,491 \$	674,250 \$	696,008 \$	711,208 \$	745
134,400 \$	67,200 \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
272,702 \$	4,516,010 \$	5,103,109 \$	5,907,678 \$	6,107,084 \$	6,303,329 \$	6,502,037 \$	6,698,392 \$	6,891,122 \$	7,082,886 \$	7,274,650 \$	7,402,867 \$	7,701
400,000 \$	450,000 \$	450,000 \$	450,000 \$	400,000 \$	400,000 \$	350,000 \$	350,000 \$	300,000 \$	300,000 \$	300,000 \$	275,000 \$	275
125,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	100,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50
150,700 \$	218,200 \$	150,800 \$	203,400 \$	144,500 \$	118,400 \$	156,500 \$	118,400 \$	158,800 \$	73,400 \$	70,500 \$	60,800 \$	83
931,367 \$	1,425,856 \$	1,194,702 \$	917,491 \$	867,375 \$	810,202 \$	763,338 \$	706,158 \$	657,007 \$	584,741 \$	512,475 \$	472,327 \$	367
231,523 \$	397,719 \$	473,715 \$	564,852 \$	581,329 \$	600,126 \$	615,533 \$	634,332 \$	650,491 \$	674,250 \$	696,008 \$	711,208 \$	745
938,591 \$	2,641,775 \$	2,419,217 \$	2,285,743 \$	2,143,204 \$	2,078,728 \$	1,985,371 \$	1,868,890 \$	1,816,298 \$	1,682,391 \$	1,630,983 \$	1,569,335 \$	1,521
434,112 \$	1,874,235 \$	2,683,893 \$	3,621,935 \$	3,963,880 \$	4,224,601 \$	4,516,667 \$	4,837,503 \$	5,074,824 \$	5,400,495 \$	5,643,666 \$	5,833,532 \$	6,179
330.66 \$	3,720,330.23 \$	3,720,330.23 \$	3,720,330.23 \$	3,599,110.00 \$	3,599,110.00 \$	1,239,172.00 \$	1,239,172.00 \$	1,239,172.00 \$	581,786.00 \$	- \$	- \$	-
330.49 \$	3,943,550.04 \$	3,943,550.04 \$	3,943,550.04 \$	3,815,056.60 \$	3,815,056.60 \$	1,313,522.32 \$	1,313,522.32 \$	1,313,522.32 \$	616,693.16 \$	- \$	- \$	-
157,712 \$	478,946 \$	608,667 \$	747,469 \$	892,852 \$	1,048,412 \$	1,153,841 \$	1,266,651 \$	1,387,357 \$	1,499,515 \$	1,604,481 \$	1,716,795 \$	1,836
179,710 \$	1,230,718 \$	1,473,241 \$	1,706,683 \$	1,921,414 \$	2,125,968 \$	2,144,526 \$	2,155,703 \$	2,158,984 \$	2,105,038 \$	2,000,072 \$	1,887,758 \$	1,767
137,421 \$	1,709,665 \$	2,081,908 \$	2,454,151 \$	2,814,265 \$	3,174,380 \$	3,298,367 \$	3,422,354 \$	3,546,341 \$	3,604,553 \$	3,604,553 \$	3,604,553 \$	3,604
309.57 \$	164,570.47 \$	601,984.74 \$	1,167,783.60 \$	1,149,614.91 \$	1,060,221.66 \$	1,218,299.67 \$	1,415,148.64 \$	1,628,482.27 \$	1,795,942.08 \$	2,039,113.36 \$	2,228,978.87 \$	2,575,318
786,559 \$	(621,989) \$	(20,004) \$	1,147,780 \$	2,297,394 \$	3,347,616 \$	4,665,916 \$	5,981,064 \$	7,509,647 \$	9,305,489 \$	11,344,602 \$	13,573,581 \$	16,148
- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	- \$	-
786,559 \$	(621,989) \$	(20,004) \$	1,147,780 \$	2,297,394 \$	3,347,616 \$	4,665,916 \$	5,981,064 \$	7,509,647 \$	9,305,489 \$	11,344,602 \$	13,573,581 \$	16,148
786,559 \$	(621,989) \$	(20,004) \$	1,147,780 \$	2,297,394 \$	3,347,616 \$	4,665,916 \$	5,981,064 \$	7,509,647 \$	9,305,489 \$	11,344,602 \$	13,573,581 \$	16,148
78,712 \$	90,891 \$	288,613 \$	479,308 \$	408,768 \$	320,344 \$	320,356 \$	320,791 \$	298,691 \$	302,550 \$	296,133 \$	279,058 \$	277
26,039 \$	100,934 \$	326,733 \$	560,908 \$	488,656 \$	395,051 \$	405,553 \$	416,886 \$	398,472 \$	414,334 \$	416,315 \$	402,724 \$	411

2

Year 10 2008	Year 11 2009	Year 12 2010	Year 13 2011	Year 14 2012	Year 15 2013	Cumulative Forecast		
						5 Year Total	10 Year Total	15 year Total
5,662,060 \$	5,840,631 \$	6,008,636 \$	6,176,641 \$	6,291,659 \$	6,556,014	11,758,826	38,279,175	69,162,766
350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000 \$	350,000	1,050,000	2,800,000	4,550,000
50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000	486,000	736,000	986,000
634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526	1,202,176	4,198,348	7,677,831
- \$	- \$	- \$	- \$	- \$	-	693,300	693,300	693,300
6,696,392 \$	6,901,122 \$	7,082,886 \$	7,274,650 \$	7,402,867 \$	7,701,540	16,189,302	46,706,823	83,068,887
350,000 \$	300,000 \$	300,000 \$	300,000 \$	275,000 \$	275,000	2,150,000	3,960,000	5,100,000
50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000 \$	50,000	676,000	1,276,000	1,826,000
118,400 \$	158,800 \$	73,400 \$	70,500 \$	60,800 \$	83,200	906,600	1,646,700	2,063,400
706,158 \$	857,007 \$	584,741 \$	512,475 \$	472,327 \$	367,943	4,651,926	8,616,486	11,210,981
634,332 \$	650,491 \$	674,250 \$	698,008 \$	711,208 \$	745,526	1,202,176	4,198,348	7,677,831
1,868,890 \$	1,816,298 \$	1,682,391 \$	1,630,983 \$	1,569,335 \$	1,521,669	9,411,602	19,763,637	27,984,212
4,837,503 \$	5,074,824 \$	5,400,495 \$	5,643,666 \$	5,833,532 \$	6,179,872	5,777,700	26,942,286	58,074,678
1,239,172.00 \$	1,239,172.00 \$	581,786.00 \$	- \$	- \$	-	\$ 20,807,322	\$ 34,204,216	\$ 36,025,174
1,313,522.32 \$	1,313,522.32 \$	616,693.16 \$	- \$	- \$	-	\$ 22,065,761	\$ 36,256,469	\$ 38,186,684
1,266,651 \$	1,387,357 \$	1,499,515 \$	1,604,481 \$	1,716,795 \$	1,836,970	\$ 1,618,132	\$ 6,727,356	\$ 14,772,474
2,155,703 \$	2,158,984 \$	2,105,038 \$	2,000,072 \$	1,887,758 \$	1,767,583	\$ 4,179,572	\$ 14,233,866	\$ 24,163,301
3,422,354 \$	3,546,341 \$	3,604,553 \$	3,604,553 \$	3,604,553 \$	3,604,553	\$ 5,797,704	\$ 20,961,222	\$ 38,925,776
1,415,148.64	1,628,482.27	1,796,942.08	2,039,113.36	2,228,978.87	2,575,318.86	\$ (20,004)	\$ 5,981,064	\$ 16,148,900
5,981,064 \$	7,609,547 \$	9,305,489 \$	11,344,602 \$	13,573,681 \$	16,148,900	\$ (20,004)	\$ 5,981,064	\$ 16,148,900
- \$	- \$	- \$	- \$	- \$	-	\$ -	\$ -	\$ -
5,981,064 \$	7,609,547 \$	9,305,489 \$	11,344,602 \$	13,573,681 \$	16,148,900			
5,981,064 \$	7,609,547 \$	9,305,489 \$	11,344,602 \$	13,573,681 \$	16,148,900			
320,791 \$	298,691 \$	302,660 \$	296,133 \$	279,058 \$	277,946	\$ 38,624,198		
						\$ 23,414,210		
						\$ 1,641,669		
416,886 \$	398,472 \$	414,334 \$	416,315 \$	402,724 \$	411,770	\$ 47,637,475		
						\$ 23,414,210		
						\$ 3,867,087		

Table B.8. Scenario and sensitivity analysis.

Defense Depot Memphis Tennessee

Scenario and Sensitivity Analysis Table - Range of Scenario NPV's

Scenario - MDRA EDC Application Business Plan*	Revenues			Operations and Maintenance	
	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10
*With mathematical corrections					
<u>Total Project Analysis View</u>					
15-Year analysis	\$ 15,908,232	\$ 45,674,754	\$ 80,277,820	\$ 9,521,823	\$ 19,873,758
15-Year analysis with USACERL developed reversion calculation	\$ 15,908,232	\$ 45,674,754	\$ 80,277,820	\$ 9,521,823	\$ 19,873,758

USACERL Developed Scenario - CERL1**	Revenues			Operations and Maintenance	
	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10
**Impact of CERL developed infrastructure costs					
<u>Total Project Analysis View</u>					
15-Year analysis	\$ 14,139,302	\$ 43,905,823	\$ 78,508,887	\$ 9,411,602	\$ 19,763,537
15-Year analysis with USACERL developed reversion calculation	\$ 14,139,302	\$ 43,905,823	\$ 78,508,887	\$ 9,411,602	\$ 19,763,537

USACERL Developed Scenario - CERL2***	Revenues			Operations and Maintenance	
	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10
***Impact of CERL developed infrastructure costs and land sales					
<u>Total Project Analysis View</u>					
15-Year analysis	\$ 15,189,302	\$ 46,705,823	\$ 83,058,887	\$ 9,411,602	\$ 19,763,537
15-Year analysis with USACERL developed reversion calculation	\$ 15,189,302	\$ 46,705,823	\$ 83,058,887	\$ 9,411,602	\$ 19,763,537

Revenues		Operations and Maintenance Costs			Debt Service Costs			Total Cash Flows		
Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total
\$ 45,674,754	\$ 80,277,820	\$ 9,521,823	\$ 19,873,758	\$ 28,094,434	\$ 7,068,468	\$ 24,280,263	\$ 44,713,301	\$ (682,059)	\$ 1,520,733	\$ 7,470,085
\$ 45,674,754	\$ 80,277,820	\$ 9,521,823	\$ 19,873,758	\$ 28,094,434	\$ 7,068,468	\$ 24,280,263	\$ 44,713,301	\$ (682,059)	\$ 1,520,733	\$ 7,470,085

Revenues		Operations and Maintenance Costs			Debt Service Costs			Total Cash Flows		
Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total
\$ 43,905,823	\$ 78,508,887	\$ 9,411,602	\$ 19,763,537	\$ 27,984,212	\$ 5,797,704	\$ 20,961,222	\$ 38,925,775	\$ (1,070,004)	\$ 3,181,064	\$ 11,598,900
\$ 43,905,823	\$ 78,508,887	\$ 9,411,602	\$ 19,763,537	\$ 27,984,212	\$ 5,797,704	\$ 20,961,222	\$ 38,925,775	\$ (1,070,004)	\$ 3,181,064	\$ 11,598,900

Revenues		Operations and Maintenance Costs			Debt Service Costs			Total Cash Flows		
Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total
\$ 46,705,823	\$ 83,058,887	\$ 9,411,602	\$ 19,763,537	\$ 27,984,212	\$ 5,797,704	\$ 20,961,222	\$ 38,925,775	\$ (20,004)	\$ 5,981,064	\$ 16,148,900
\$ 46,705,823	\$ 83,058,887	\$ 9,411,602	\$ 19,763,537	\$ 27,984,212	\$ 5,797,704	\$ 20,961,222	\$ 38,925,775	\$ (20,004)	\$ 5,981,064	\$ 16,148,900

Conclusion: Estimated MDRA Business Plan Valuation
Reduced Capital Improvements and No Land Sales
Reduced Capital Improvements and Land Sales

USACERL's Estimation of Net Present Value

Service Costs		Total Cash Flows			Net Present Value (NPV) 15 Years	
Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Discount Rate	
					18%	15%

1,280,263 \$ 44,713,301 \$ (682,059) \$ 1,520,733 \$ 7,470,085 \$ 1,135,449 \$ 1,471,912

1,280,263 \$ 44,713,301 \$ (682,059) \$ 1,520,733 \$ 7,470,085 \$ 1,490,513 \$ 2,790,457

Service Costs		Total Cash Flows			Net Present Value (NPV) 15 Years	
Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Discount Rate	
					16%	13%

0,961,222 \$ 38,925,775 \$ (1,070,004) \$ 3,181,064 \$ 11,598,900 \$ 1,761,798 \$ 2,494,805

0,961,222 \$ 38,925,775 \$ (1,070,004) \$ 3,181,064 \$ 11,598,900 \$ 3,167,227 \$ 5,921,416

Service Costs		Total Cash Flows			Net Present Value (NPV) 15 Years	
Years 1-10	15-Year Total	Years 1-5	Years 1-10	15-Year Total	Discount Rate	
					16%	13%

0,961,222 \$ 38,925,775 \$ (20,004) \$ 5,981,064 \$ 16,148,900 \$ 3,151,337 \$ 4,172,801

0,961,222 \$ 38,925,775 \$ (20,004) \$ 5,981,064 \$ 16,148,900 \$ 4,792,946 \$ 8,029,888

Conclusion: Estimated MDRA Business Plan Valuation		16%	13%
Reduced Capital Improvements and No Land Sales		\$ 3,167,227	\$ 5,921,416
Reduced Capital Improvements and Land Sales		\$ 4,792,946	\$ 8,029,888
USACERL's Estimation of Net Present Value		\$ 3,167,227	\$ 8,029,888

Appendix C: Engineering Analysis

Table C.1. Cost comparisons for DDMT total.

Project Description		CERL Estimate (Apples to Apples)		CERL Scenario (CERL1 Scenario)	
Infrastructure	LRA	Low	High	Low	High
Perimeter Landscaping					
Landscape Buffer	\$330,000	\$327,000	\$387,000	\$186,000	\$220,000
Wrought Iron Fence on Airways Blvd	\$165,000	\$118,000	\$140,000	\$78,000	\$93,000
Entrance Landscape	\$55,000	\$55,000	\$64,000	\$55,000	\$64,000
Interior Landscaping	\$220,000	\$276,000	\$326,000	\$121,000	\$143,000
Street Trees	\$440,000	\$446,000	\$527,000	\$320,000	\$378,000
Parking Lot Landscaping	\$137,500	\$147,000	\$174,000	\$105,000	\$124,000
Signage					
Main Entrance	\$22,000	\$21,000	\$25,000	\$20,000	\$25,000
Sign at Airways Blvd. and Dunn Avenue	\$22,000	\$21,000	\$25,000	\$13,000	\$15,000
Secondary Entrances	\$11,000	\$10,000	\$12,000	\$29,000	\$34,000
Internal Road Signs	\$33,000	\$34,000	\$40,000	\$34,000	\$40,000
Sanitary Sewer Upgrade					
Inspection Report, Tape, etc.	\$385,000	\$300,000	\$354,000	\$243,000	\$287,000
Removal/Replacement of pipes/mains	\$792,000	\$750,000	\$872,000	\$227,000	\$273,000
Structures	\$247,500	\$255,000	\$300,000	\$125,000	\$149,000
Service lines	\$165,000	\$55,000	\$65,000	\$39,000	\$46,000
Water Distribution Upgrade	\$275,000	\$243,000	\$287,000	\$0	\$0
System modifications	\$825,000	\$767,000	\$907,000	\$610,000	\$722,000
Removal and Installation of Fire hydrants	\$880,000	\$819,000	\$968,000	\$244,000	\$287,000
Meters/connections	\$770,000	\$169,000	\$200,000	\$169,000	\$200,000
Telecommunications Upgrade	\$715,000	\$591,000	\$697,000	\$126,000	\$150,000
Electrical System Upgrade	\$330,000	\$287,000	\$340,000	\$0	\$0
Electrical Pole Removal/Installation	\$660,000	\$647,000	\$765,000	\$151,000	\$179,000
Single and three phase primary removal/Installation and Riser Installation	\$412,500	\$371,000	\$438,000	\$223,000	\$263,000
Single and Three phase transformers removal/installation	\$412,500	\$341,000	\$404,000	\$273,000	\$323,000
Underground Extension	\$1,100,000	\$914,000	\$1,080,000	\$410,000	\$484,000
Metering (25 S-12 & s-18 Meters) & Removal of primary meters	\$330,000	\$141,000	\$167,000	\$141,000	\$167,000
Storm Water System Upgrade	\$275,000	\$265,000	\$313,000	\$0	\$0
Existing System modifications	\$385,000	\$385,000	\$456,000	\$224,000	\$266,000

Removal/Installation of pipes and structures	\$275,000	\$276,000	\$326,000	\$30,000	\$36,000
Changes to system in area slated for future development	\$220,000	\$198,000	\$234,000	\$56,000	\$66,000
Natural Gas Upgrade	\$880,000	\$824,000	\$973,000	\$1,276,000	\$1,507,000
Internal Roadways					
Upgrade Boulevard (G Street), 1st Street South of G Street	\$990,000	\$1,045,000	\$1,236,000	\$953,000	\$1,125,000
New Road that parallels Dunn Avenue, upgrade 2nd Street	\$880,000	\$905,000	\$1,070,000	\$750,000	\$886,000
Upgrade 4th Street, J Street, 3rd Street	\$770,000	\$850,000	\$1,005,000	\$550,000	\$650,000
Roads on west side	\$2,255,000	\$2,458,000	\$2,905,000	\$1,408,000	\$1,665,000
Railroad removal	\$0	\$502,000	\$594,000	\$502,000	\$594,000
Parking lot construction	\$6,748,500	\$7,549,000	\$8,922,000	\$4,391,000	\$5,189,000
Buildings					
Main admin bldg 144 - code compliance	\$110,000	\$139,776	\$165,190	\$0	\$0
Main ad bldg 144 - fire suppression	\$220,000	\$155,027	\$183,213	\$0	\$0
Typical 20's buildings - code compliance	\$935,000	\$700,000	\$828,000	\$0	\$0
Typical 20's buildings - fire suppression	\$3,080,000	\$2,534,000	\$2,994,000	\$810,200	\$957,500
Typical 20's buildings - enhancements	\$4,125,000	\$4,074,066	\$4,814,805	\$4,074,066	\$4,814,805
Korean Typical buildings - code compliance	\$495,000	\$450,000	\$532,000	\$0	\$0
Korean Typical buildings - fire suppression	\$2,420,000	\$1,678,000	\$1,983,000	\$222,818	\$394,996
Korean Typical buildings - enhancements	\$440,000	\$586,276	\$692,872	\$390,851	\$692,872
Building 835 - code compliance	\$55,000	\$40,000	\$47,000	\$0	\$0
Building 925 - code compliance	\$0	\$0	\$0	\$0	\$0
Demo					
Bldgs 209, 359, 465, 467, 468, 469, 559	\$2,145,000	\$1,907,000	\$2,477,000	\$1,907,000	\$2,477,000
Bldgs 210, 308, 309, 319, 416, 417, 949 and minors	\$1,012,000	\$992,000	\$1,324,000	\$992,000	\$1,324,000
Bldgs 349, 449, 549, 649, 720, 737, 770, 771, 783, 787, 793, 860, 863	\$2,090,000	\$1,838,000	\$2,450,000	\$1,838,000	\$2,450,000
Bldgs 873, 875, 970, 972	\$1,760,000	\$1,902,000	\$2,916,000	\$1,902,000	\$2,916,000
Bldgs 995, 1084, 1086, 1087, 1088, 1089, 1090, 1091	\$330,000	\$261,000	\$348,000	\$261,000	\$348,000
Roofing Repairs/Replacement	\$0	\$0	\$0	\$3,000,000	\$3,000,000
TOTALS	\$42,630,501	\$40,619,145	\$49,353,081	\$29,018,770	\$36,025,173

Table C.2. "Apples to Apples" estimates — Install trees/grass buffer.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new trees/grass</i>						
Hauling of fill	3,704	CY	\$19.00	\$70,370	022-266-0560	98 Site p. 51
Spread fill material	3,704	CY	\$1.39	\$5,148	022-262-0010	98 Site p. 51
Install sod	200	MSF	\$700.00	\$140,000	029-316-0300	98 Site p. 122
Install trees and pit	100	EA	\$100.07	\$10,007	A12.7-421-0000/R029-540	98 Site
Irrigation system	200,000	SF	\$0.61	\$122,000	028-104-0900	98 Site p. 108
SUBTOTAL				\$347,526		
City cost index	85.6%					
TOTAL				\$297,482		
TOTAL with contingency of:	10%			\$327,230		
TOTAL with contingency of:	30%			\$386,726		
<u>ROUNDED TO</u>				<u>\$327,000</u>		
<u>ROUNDED TO</u>				<u>\$387,000</u>		

Table C.3. "CERL Scenario" estimates — Install trees/grass buffer.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new trees/grass</i>						
Hauling of fill	2,083	CY	\$19.00	\$39,583	022-266-0560	98 Site p. 51
Spread fill material	2,083	CY	\$1.39	\$2,896	022-262-0010	98 Site p. 51
Install sod	113	MSF	\$700.00	\$79,100	029-316-0300	98 Site p. 122
Install trees and pit	75	EA	\$100.07	\$7,505	A12.7-421-0000/R029-540	98 Site
Irrigation system	112,500	SF	\$0.61	\$68,625	028-104-0900	98 Site p. 108
SUBTOTAL				\$197,709		
City cost index	85.6%					
TOTAL				\$169,239		
TOTAL with contingency of:	10%			\$186,163		
TOTAL with contingency of:	30%			\$220,011		
<u>ROUNDED TO</u>				<u>\$186,000</u>		
<u>ROUNDED TO</u>				<u>\$220,000</u>		

Table C.4. "Apples to Apples" Estimates — install wrought iron fence.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new fence</i>						
Install new fence 6' high	3,700	LF	\$34.00	\$125,800	028-320-5600	98 Site p. 113
SUBTOTAL				\$125,800		
City cost index	85.6%					
TOTAL				\$107,685		
TOTAL with contingency of:	10%			\$118,453		
TOTAL with contingency of:	30%			\$139,990		
<u>ROUNDED TO</u>				<u>\$118,000</u>		
<u>ROUNDED TO</u>				<u>\$140,000</u>		

Table C.5. "CERL Scenario" estimates — install wrought iron fence.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new fence</i>						
Install new fence 4' high	3,700	LF	\$22.50	\$83,250	028-320-5600	98 Site p. 113
SUBTOTAL				\$83,250		
City cost index	85.6%					
TOTAL				\$71,262		
TOTAL with contingency of:	10%			\$78,388		
TOTAL with contingency of:	30%			\$92,641		
<u>ROUNDED TO</u>				<u>\$78,000</u>		
<u>ROUNDED TO</u>				<u>\$93,000</u>		

Table C.6. "Apples to Apples" estimates — install entrance landscaping.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new entrance</i>						
Hauling of fill	93	CY	\$19.00	\$1,759	022-266-0560	98 Site p. 51
Spread fill material	93	CY	\$1.39	\$129	022-262-0010	98 Site p. 51
Install sod	5	MSF	\$700.00	\$3,500	029-316-0300	98 Site p. 122
Install trees and pit	40	EA	\$100.07	\$4,003	A12.7-421-0000/R029-540	98 Site
Irrigation system	5,000	SF	\$0.61	\$3,050	028-104-0900	98 Site p. 108
Install shrubs	40	EA	\$69.85	\$2,794	S	
Install flowers	100	EA	\$10.00	\$1,000	S	
Install street lights 400 watt	20	EA	\$2,085.00	\$41,700	A12.7-500-2320	98 Site p. 409
SUBTOTAL				\$57,935		
City cost index	85.6%					
TOTAL				\$49,592		
TOTAL with contingency of:	10%			\$54,551		
TOTAL with contingency of:	30%			\$64,470		
ROUNDED TO				\$55,000		
ROUNDED TO				\$64,000		

Table C.7. "CERL Scenario" Estimates — install entrance landscaping.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new entrance</i>						
Hauling of fill	93	CY	\$19.00	\$1,759	022-266-0560	98 Site p. 51
Spread fill material	93	CY	\$1.39	\$129	022-262-0010	98 Site p. 51
Install sod	5	MSF	\$700.00	\$3,500	029-316-0300	98 Site p. 122
Install trees and pit	40	EA	\$100.07	\$4,003	A12.7-421-0000/R029-540	98 Site
Irrigation system	5,000	SF	\$0.61	\$3,050	028-104-0900	98 Site p. 108
Install shrubs	40	EA	\$69.85	\$2,794	S	
Install flowers	100	EA	\$10.00	\$1,000	S	
Install street lights 400 watt	20	EA	\$2,085.00	\$41,700	A12.7-500-2320	98 Site p. 409
SUBTOTAL				\$57,935		
City cost index	85.6%					
TOTAL				\$49,592		
TOTAL with contingency of:	10%			\$54,551		
TOTAL with contingency of:	30%			\$64,470		
ROUNDED TO				\$55,000		
ROUNDED TO				\$64,000		

Table C.8. "Apples to Apples" estimates — install trees/grass of five areas each 25 x 500 x 2 sides.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
Install new trees/grass						
Hauling of fill	1,157	CY	\$19.00	\$21,991	022-266-0560	98 Site p. 51
Spread fill material	1,157	CY	\$1.39	\$1,609	022-262-0010	98 Site p. 51
Install sod	126	MSF	\$700.00	\$88,200	029-316-0300	98 Site p. 122
Install trees and pit	50	EA	\$100.07	\$5,004	A12.7-421-0000/R029-540	98 Site
Irrigation system	62,500	SF	\$0.61	\$38,125	028-104-0900	98 Site p. 108
SUBTOTAL				\$154,928		
City cost index	85.6%					
TOTAL				\$132,618		
TOTAL with contingency of:	10%			\$145,880		
TOTAL with contingency of:	30%			\$172,404		
<u>ROUNDED TO</u>				<u>\$146,000</u>		
<u>ROUNDED TO</u>				<u>\$172,000</u>		

Table C.9. "CERL Scenario" estimates - install trees/grass of five areas each 10 x 500 x 2 sides.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
Install new trees/grass						
Hauling of fill	463	CY	\$19.00	\$8,796	022-266-0560	98 Site p. 51
Spread fill material	463	CY	\$1.39	\$644	022-262-0010	98 Site p. 51
Install sod	50	MSF	\$700.00	\$35,000	029-316-0300	98 Site p. 122
Install trees and pit	50	EA	\$100.07	\$5,004	A12.7-421-0000/R029-540	98 Site
Irrigation system	25,000	SF	\$0.61	\$15,250	028-104-0900	98 Site p. 108
SUBTOTAL				\$64,693		
City cost index	85.6%					
TOTAL				\$55,377		
TOTAL with contingency of:	10%			\$60,915		
TOTAL with contingency of:	30%			\$71,991		
<u>ROUNDED TO</u>				<u>\$61,000</u>		
<u>ROUNDED TO</u>				<u>\$72,000</u>		

Table C.10. "Apples to Apples" estimates — install trees/grass.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new trees/grass</i>						
Hauling of fill	1,766	CY	\$19.00	\$33,553	022-266-0560	98 Site p. 51
Spread fill material	1,766	CY	\$1.39	\$2,455	022-262-0010	98 Site p. 51
Install sod	190	MSF	\$700.00	\$133,000	029-316-0300	98 Site p. 122
Install trees and pit	238	EA	\$100.07	\$23,857	A12.7-421-0000/R029-540	98 Site
Irrigation system	95,360	SF	\$0.61	\$58,170	028-104-0900	98 Site p. 108
SUBTOTAL				\$251,034		
City cost index	85.6%					
TOTAL				\$214,885		
TOTAL with contingency of:	10%			\$236,373		
TOTAL with contingency of:	30%			\$279,350		
<u>ROUNDED TO</u>				<u>\$236,000</u>		
<u>ROUNDED TO</u>				<u>\$279,000</u>		

Table C.11. "CERL Scenario" estimates - install trees/grass.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
Install new trees/grass						
Hauling of fill	1,324	CY	\$19.00	\$25,164	022-266-0560	98 Site p. 51
Spread fill material	1,324	CY	\$1.39	\$1,841	022-262-0010	98 Site p. 51
Install sod	144	MSF	\$700.00	\$100,800	029-316-0300	98 Site p. 122
Install trees and pit	191	EA	\$50.04	\$9,543	A12.7-421-0000/R029-540	98 Site
Irrigation system	71,520	SF	\$0.61	\$43,627	028-104-0900	98 Site p. 108
SUBTOTAL				\$180,975		
City cost index	85.6%					
TOTAL				\$154,915		
TOTAL with contingency of:	10%			\$170,406		
TOTAL with contingency of:	30%			\$201,389		
ROUNDED TO				\$170,000		
ROUNDED TO				\$201,000		

Table C.12. "Apples to Apples" and "CERL Scenario" estimates for road signs on G Street and 1st Street, each.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install traffic control directional signs						
Install new signs	6	EA	\$79.00	\$474	028-412-0600 & 028-412-1600	98 Site p. 115
Excavate for new posts	2	CY	\$4.56	\$10	022-254-0060	98 Site p. 49
Concrete for new posts	2	CY	\$520.00	\$1,089	033-130-1520	97 Site
Total					\$1,572	
Install reflective street signs						
Install new signs	12	EA	\$102.00	\$1,224	104-304-4900	98 Site p. 232
Excavate for new posts	4	CY	\$4.56	\$19	022-254-0060	98 Site p. 49
Concrete for new posts	4	CY	\$520.00	\$2,177	033-130-1520	97 Site
Paint markings						
Layout of crosswalk	120	LF	\$0.04	\$5	025-804-0790	98 Site p. 76
Paint crosswalk (Thermoplastic paint)	120	LF	\$1.10	\$132	025-804-0730	98 Site p. 75
SUBTOTAL				\$5,129		
City cost index	85.6%					
TOTAL				\$4,390		
TOTAL with contingency of:	10%		\$439	\$4,830		
TOTAL with contingency of:	30%		\$1,317	\$5,708		
ROUNDED TO				\$5,000		
ROUNDED TO				\$6,000		

Table C.13. "Apples to Apples" estimates — Install new entrance sign.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new entrance sign</i>						
Install new signs	2	EA	\$4,500.00	\$9,000	104-104-0900	98 Site p. 231
Excavate for new posts	7	CY	\$4.53	\$33	022-254-0060	97 Site p. 254
Concrete for new posts	7	CY	\$636.76	\$4,668	R033-100	97 Site p. 468
Install street lights 400 watt	4	EA	\$2,085.00	\$8,340	A12.7-500-2320	98 Site p. 409
SUBTOTAL				\$22,041		
City cost index	85.6%					
TOTAL				\$18,867		
TOTAL with contingency of:	10%			\$20,754		
TOTAL with contingency of:	30%			\$24,527		
<u>ROUNDED TO</u>				<u>\$21,000</u>		
<u>ROUNDED TO</u>				<u>\$25,000</u>		

Table C.14. "CERL Scenario" estimates - Install new entrance sign.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new entrance sign</i>						
Install new signs	1	EA	\$4,500.00	\$4,500	104-104-0900	98 Site p. 231
Excavate for new posts	7	CY	\$4.56	\$33	022-254-0060	98 Site p. 49
Concrete for new posts	7	CY	\$636.76	\$4,668	R033-100	97 Site p. 468
Install street lights 400 watt	2	EA	\$2,085.00	\$4,170	A12.7-500-2320	98 Site p. 409
SUBTOTAL				\$13,371		
City cost index	85.6%					
TOTAL				\$11,446		
TOTAL with contingency of:	10%			\$12,590		
TOTAL with contingency of:	30%			\$14,879		
<u>ROUNDED TO</u>				<u>\$13,000</u>		
<u>ROUNDED TO</u>				<u>\$15,000</u>		

Table C.15. "Apples to Apples" estimates — Install new secondary entrance sign.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new entrance sign</i>						
Install new signs	1	EA	\$2,250.00	\$2,250	104-104-0900	98 Site p. 231
Excavate for new posts	7	CY	\$4.53	\$33	022-254-0060	97 Site p. 254
Concrete for new posts	7	CY	\$636.76	\$4,668	R033-100	97 Site p. 468
Install street lights 400 watt	2	EA	\$2,085.00	\$4,170	A12.7-500-2320	98 Site p. 409
SUBTOTAL				\$11,121		
City cost index	85.6%					
TOTAL				\$9,520		
TOTAL with contingency of:	10%			\$10,471		
TOTAL with contingency of:	30%			\$12,375		
<u>ROUNDED TO</u>				<u>\$10,000</u>		
<u>ROUNDED TO</u>				<u>\$12,000</u>		

Table C.16. "CERL Scenario" estimates — Install new secondary entrance sign.

Action	Quantity	UOM	Cost/Unit	Total Cost	Means Ref. No.	Book
<i>Install new entrance sign</i>						
Install new signs	4	EA	\$2,250.00	\$9,000	104-104-0900	98 Site p. 231
Excavate for new posts	7	CY	\$4.53	\$33	022-254-0060	97 Site p. 254
Concrete for new posts	7	CY	\$636.76	\$4,668	R033-100	97 Site p. 468
Install street lights 400 watt	8	EA	\$2,085.00	\$16,680	A12.7-500-2320	98 Site p. 409
SUBTOTAL				\$30,381		
City cost index	85.6%					
TOTAL				\$26,006		
TOTAL with contingency of:	10%			\$28,607		
TOTAL with contingency of:	30%			\$33,808		
<u>ROUNDED TO</u>				<u>\$29,000</u>		
<u>ROUNDED TO</u>				<u>\$34,000</u>		

Table C.17. "Apples to Apples" Estimates — video tape sanitary and storm lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Video tape</i>						
VideoTape	132	500lf	\$1,035.00	\$136,620	026-108-6150	98 Site p. 78
Mob charge	82,500	LF	\$2.20	\$181,500	026-108-6180	
SUBTOTAL				\$318,120		
City cost index	85.6%					
TOTAL				\$272,311		
TOTAL with contingency of:	10%		\$27,231	\$299,542		
TOTAL with contingency of:	30%		\$81,693	\$354,004		
<u>ROUNDED TO</u>				<u>\$300,000</u>		
<u>ROUNDED TO</u>				<u>\$354,000</u>		

Table C.18. "CERL Scenario" estimates — video tape sanitary and storm lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Video tape</i>						
VideoTape	132	500lf	\$1,035.00	\$136,620	026-108-6150	98 Site p. 78
Mob charge	55,000	LF	\$2.20	\$121,000	026-108-6180	
SUBTOTAL				\$257,620		
City cost index	85.6%					
TOTAL				\$220,523		
TOTAL with contingency of:	10%		\$22,052	\$242,575		
TOTAL with contingency of:	30%		\$66,157	\$286,680		
<u>ROUNDED TO</u>				<u>\$243,000</u>		
<u>ROUNDED TO</u>				<u>\$287,000</u>		

Table C.19. "Apples to Apples" estimates — install 1650 LF of new service lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install Pipe						
Excavate/backfill trench	1,815	LF	\$4.11	\$7,460	A12.3-110-1330	98 Site p. 372
Install pipe bedding	1,815	LF	\$0.87	\$1,579	A12.3-310-1440	98 Site p. 375
Install 6" diameter ductile iron	1,650	LF	\$16.00	\$26,400	026-666-2040	98 Site p. 83
SUBTOTAL				\$35,439		
City cost index	85.6%					
TOTAL				\$30,336		
TOTAL with contingency of:	10%		\$3,034	\$33,369		
TOTAL with contingency of:	30%		\$9,101	\$39,436		
<u>ROUNDED TO</u>				<u>\$33,000</u>		
<u>ROUNDED TO</u>				<u>\$39,000</u>		

Table C.20. "CERL Scenario" estimates - install 825 lf of new service lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install Pipe						
Excavate/backfill trench	908	LF	\$4.11	\$3,730	A12.3-110-1330	98 Site p. 372
Install pipe bedding	908	LF	\$0.87	\$790	A12.3-310-1440	98 Site p. 375
Install 6" diameter PVC pipe	825	LF	\$16.00	\$13,200	026-666-2040	98 Site p. 83
SUBTOTAL				\$17,719		
City cost index	85.6%					
TOTAL				\$15,168		
TOTAL with contingency of:	10%		\$1,517	\$16,685		
TOTAL with contingency of:	30%		\$4,550	\$19,718		
<u>ROUNDED TO</u>				<u>\$17,000</u>		
<u>ROUNDED TO</u>				<u>\$20,000</u>		

Table C.21. "Apples to Apples" estimates — install 550 lf of new service lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install Pipe</i>						
Excavate/backfill trench	605	LF	\$4.11	\$2,487	A12.3-110-1330	98 Site p. 372
Install pipe bedding	605	LF	\$0.87	\$526	A12.3-310-1440	98 Site p. 375
Install 6" diameter ductile iron	550	LF	\$16.00	\$8,800	026-666-2040	98 Site p. 83
SUBTOTAL				\$11,813		
City cost index	85.6%					
TOTAL				\$10,112		
TOTAL with contingency of:	10%		\$1,011	\$11,123		
TOTAL with contingency of:	30%		\$3,034	\$13,145		
<u>ROUNDED TO</u>				<u>\$11,000</u>		
<u>ROUNDED TO</u>				<u>\$13,000</u>		

Table C.22. "CERL Scenario" estimates — install 550 lf of new service lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install Pipe</i>						
Excavate/backfill trench	605	LF	\$4.11	\$2,487	A12.3-110-1330	98 Site p. 372
Install pipe bedding	605	LF	\$0.87	\$526	A12.3-310-1440	98 Site p. 375
Install 6" diameter ductile iron	550	LF	\$16.00	\$8,800	026-666-2040	98 Site p. 83
SUBTOTAL				\$11,813		
City cost index	85.6%					
TOTAL				\$10,112		
TOTAL with contingency of:	10%		\$1,011	\$11,123		
TOTAL with contingency of:	30%		\$3,034	\$13,145		
<u>ROUNDED TO</u>				<u>\$11,000</u>		
<u>ROUNDED TO</u>				<u>\$13,000</u>		

Table C.23. "Apples to Apples" estimates — replace existing electrical poles (Phase 6).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install new poles</i>						
Excavate for new poles	106	EA	\$205.00	\$21,648	169-110-0100	98 Electrical p. 261
Install new poles	106	EA	\$710.00	\$74,976	167-110-2000	98 Heavy p. 291
Install new cross arms	211	EA	\$267.00	\$56,390	167-110-3600	99 Heavy p. 291
Install wire	10,560	LF	\$14.30	\$151,008	161-105-8300	98 Electrical p. 138
SUBTOTAL				\$304,022		
City cost index	86%					
TOTAL				\$261,155		
TOTAL with contingency of:	10%			\$287,271		
TOTAL with contingency of:	30%			\$339,502		
<u>ROUNDED TO</u>				<u>\$287,000</u>		
<u>ROUNDED TO</u>				<u>\$340,000</u>		

Table C.24. "Apples to Apples" estimates — replace existing electrical poles (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove old poles</i>						
Remove old poles	317	EA	\$197.00	\$62,410	167-110-2000	98 Heavy p. 291
Rubbish handling	737	CY	\$14.40	\$10,616	020-620-3080	98 Heavy p. 31
Haul debris to dump	737	CY	\$6.40	\$4,718	020-620-5000	98 Heavy p. 31
Disposal fee for debris	737	CY	\$6.00	\$4,423		BFI
<i>Install new poles</i>						
Excavate for new poles	317	EA	\$205.00	\$64,944	169-110-0100	98 Electrical p. 261
Install new poles	317	EA	\$710.00	\$224,928	167-110-2000	98 Heavy p. 291
Install new cross arms	634	EA	\$267.00	\$169,171	167-110-3600	99 Heavy p. 291
SUBTOTAL				\$541,210		
City cost index	86%					
TOTAL				\$464,900		
TOTAL with contingency of:	10%			\$511,390		
TOTAL with contingency of:	30%			\$604,370		
<u>ROUNDED TO</u>				<u>\$511,000</u>		
<u>ROUNDED TO</u>				<u>\$604,000</u>		

Table C.25. "CERL Scenario" estimates — replace existing electrical poles (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove old poles</i>						
Remove old poles	79	EA	\$197.00	\$15,602	167-110-2000	98 Heavy p. 291
Rubbish handling	184	CY	\$14.40	\$2,654	020-620-3080	98 Heavy p. 31
Haul debris to dump	184	CY	\$6.40	\$1,180	020-620-5000	98 Heavy p. 31
Disposal fee for debris	184	CY	\$6.00	\$1,106		BFI
<i>Install new poles</i>						
Excavate for new poles	107	CY	\$5.55	\$595	022-254-0050	98 heavy
Install new poles	79	EA	\$710.00	\$56,232	167-110-2000	98 Heavy p. 291
Install new cross arms	158	EA	\$267.00	\$42,293	167-110-3600	99 Heavy p. 291
SUBTOTAL				\$119,662		
City cost index	86%					
TOTAL				\$102,789		
TOTAL with contingency of:	10%			\$113,068		
TOTAL with contingency of:	30%			\$133,626		
<u>ROUNDED TO</u>				<u>\$113,000</u>		
<u>ROUNDED TO</u>				<u>\$134,000</u>		

Table C.26. "Apples to Apples" estimates — replace existing electrical poles (Phase 5).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove old poles</i>						
Remove old poles	84	EA	\$197.00	\$16,643	167-110-2000	98 Heavy p. 291
Rubbish handling	197	CY	\$14.40	\$2,831	020-620-3080	98 Heavy p. 31
Haul debris to dump	197	CY	\$6.40	\$1,258	020-620-5000	98 Heavy p. 31
Disposal fee for debris	197	CY	\$6.00	\$1,180		BFI
<i>Install new poles</i>						
Excavate for new poles	84	EA	\$205.00	\$17,318	169-110-0100	98 Electrical p. 261
Install new poles	84	EA	\$710.00	\$59,981	167-110-2000	98 Heavy p. 291
Install new cross arms	169	EA	\$267.00	\$45,112	167-110-3600	99 Heavy p. 291
SUBTOTAL				\$144,323		
City cost index	86%					
TOTAL				\$123,973		
TOTAL with contingency of:	10%			\$136,371		
TOTAL with contingency of:	30%			\$161,165		
<u>ROUNDED TO</u>				<u>\$136,000</u>		
<u>ROUNDED TO</u>				<u>\$161,000</u>		

Table C.27. "CERL Scenario" estimates — replace existing electrical poles (Phase 5).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove old poles</i>						
Remove old poles	26	EA	\$197.00	\$5,201	167-110-2000	98 Heavy p. 291
Rubbish handling	61	CY	\$14.40	\$885	020-620-3080	98 Heavy p. 31
Haul debris to dump	61	CY	\$6.40	\$393	020-620-5000	98 Heavy p. 31
Disposal fee for debris	61	CY	\$6.00	\$369		BFI
<i>Install new poles</i>						
Excavate for new poles	36	CY	\$5.55	\$198	022-254-0050	98 heavy
Install new poles	26	EA	\$710.00	\$18,744	167-110-2000	98 Heavy page 291
Install new cross arms	53	EA	\$267.00	\$14,098	167-110-3600	99 Heavy page 291
SUBTOTAL				\$39,887		
City cost index	86%					
TOTAL				\$34,263		
TOTAL with contingency of:	10%			\$37,689		
TOTAL with contingency of:	30%			\$44,542		
<u>ROUNDED TO</u>				<u>\$38,000</u>		
<u>ROUNDED TO</u>				<u>\$45,000</u>		

Table C.28. "Apples to Apples" estimates — install new primary services to buildings (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing transformers</i>						
Remove old transformers	86	EA	\$197.00	\$16,844	020-708-1550	98 Heavy p. 34
Rubbish handling	90	CY	\$14.40	\$1,289	020-620-3080	98 Heavy p. 31
Haul debris to dump	90	CY	\$6.40	\$573	020-620-5000	98 Heavy p. 31
Disposal fee for debris	90	CY	\$6.00	\$537		BFI
<i>Install transformer pads</i>						
Grade soil	760	SY	\$3.03	\$2,303	025-122-0010	98 Heavy p. 73
Install pads	855	LF	\$26.50	\$22,658	A12.7-140-1580	98 Heavy p. 339
<i>Install transformer</i>						
Install 350 MCM wire	46	CLF	\$575.00	\$26,220	R161-115	98 Electrical p. 374
Install transformer 75 KVA	86	EA	\$3,100.00	\$265,050	164-120-3700	98 Electrical p. 203
Install ground rod	86	EA	\$102.00	\$8,721	161-810-0050	98 Electrical p. 152
Install grounding wire	9	CLF	\$345.00	\$2,950	161-810-0280	98 Electrical p. 153
SUBTOTAL				\$327,901		
City cost index	86%					
TOTAL				\$280,683		
TOTAL with contingency of:	10%			\$308,752		
TOTAL with contingency of:	30%			\$364,888		
<u>ROUNDED TO</u>				<u>\$309,000</u>		
<u>ROUNDED TO</u>				<u>\$365,000</u>		

Table C.29. "CERL Scenario" estimates — install new primary services to buildings (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing transformers</i>						
Remove old transformers	26	EA	\$197.00	\$5,053	020-708-1550	98 Heavy p. 34
Rubbish handling	27	CY	\$14.40	\$387	020-620-3080	98 Heavy p. 31
Haul debris to dump	27	CY	\$6.40	\$172	020-620-5000	98 Heavy p. 31
Disposal fee for debris	27	CY	\$6.00	\$161		BFI
<i>Install transformer pads</i>						
Grade soil	228	SY	\$3.03	\$691	025-122-0010	98 Heavy p. 73
Install pads	257	LF	\$26.50	\$6,797	A12.7-140-1580	98 Heavy p. 339
<i>Install transformer</i>						
Install 350 MCM wire	14	CLF	\$575.00	\$7,866	R161-115	98 Electrical p. 374
Install transformer 150 KVA	26	EA	\$4,800.00	\$123,120	164-120-3700	98 Electrical p. 203
Install ground rod	26	EA	\$102.00	\$2,616	161-810-0050	98 Electrical p. 152
Install grounding wire	3	CLF	\$345.00	\$885	161-810-0280	98 Electrical p. 153
SUBTOTAL				\$141,975		
City cost index	86%					
TOTAL				\$121,531		
TOTAL with contingency of:	10%			\$133,684		
TOTAL with contingency of:	30%			\$157,990		
<i>ROUNDED TO</i>				<i>\$134,000</i>		
<i>ROUNDED TO</i>				<i>\$158,000</i>		

Table C.30. "Apples to Apples" estimates — install new primary services to buildings (Phase 5).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing transformers</i>						
Remove old transformers	17	EA	\$197.00	\$3,369	020-708-1550	98 Heavy p. 34
Rubbish handling	18	CY	\$14.40	\$258	020-620-3080	98 Heavy p. 31
Haul debris to dump	18	CY	\$6.40	\$115	020-620-5000	98 Heavy p. 31
Disposal fee for debris	18	CY	\$6.00	\$107		BFI
Total					\$3,849	
<i>Install transformer pads</i>						
Grade soil	152	SY	\$3.03	\$461	025-122-0010	98 Heavy p. 73
Install pads	171	LF	\$26.50	\$4,532	A12.7-140-1580	98 Heavy p. 339
					\$4,992	
<i>Install transformer</i>						
Install 350 MCM wire	9	CLF	\$575.00	\$5,244	R161-115	98 Electrical p. 374
Install transformer 75 KVA	17	EA	\$3,100.00	\$53,010	164-120-3700	98 Electrical p. 203
Install ground rod	17	EA	\$102.00	\$1,744	161-810-0050	98 Electrical p. 152
Install grounding wire	2	CLF	\$345.00	\$590	161-810-0280	98 Electrical p. 153
Total					\$60,588	
SUBTOTAL				\$65,580	\$65,580	= \$0
City cost index	86%				\$0	check
TOTAL				\$56,137		
TOTAL with contingency of:	10%			\$61,750		
TOTAL with contingency of:	30%			\$72,978		
<i>ROUNDED TO</i>				<i>\$62,000</i>		
<i>ROUNDED TO</i>				<i>\$73,000</i>		

Table C.31. "CERL Scenario" estimates — install new primary services to buildings (Phase 5).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing Transformers</i>						
Remove old transformers	17	EA	\$197.00	\$3,369	020-708-1550	98 Heavy p. 34
Rubbish handling	18	CY	\$14.40	\$258	020-620-3080	98 Heavy p. 31
Haul debris to dump	18	CY	\$6.40	\$115	020-620-5000	98 Heavy p. 31
Disposal fee for debris	18	CY	\$6.00	\$107		BFI
<i>Install transformer pads</i>						
Grade soil	152	SY	\$3.03	\$461	025-122-0010	98 Heavy p. 73
Install pads	171	LF	\$26.50	\$4,532	A12.7-140-1580	98 Heavy p. 339
<i>Install transformer</i>						
Install 350 MCM wire	9	CLF	\$575.00	\$5,244	R161-115	98 Electrical p. 374
Install transformer 150 KVA	17	EA	\$4,800.00	\$82,080	164-120-3700	98 Electrical p. 203
Install ground rod	17	EA	\$102.00	\$1,744	161-810-0050	98 Electrical p. 152
Install grounding wire	2	CLF	\$345.00	\$590	161-810-0280	98 Electrical p. 153
SUBTOTAL				\$94,650		
City cost index	86%					
TOTAL				\$81,021		
TOTAL with contingency of:	10%			\$89,123		
TOTAL with contingency of:	30%			\$105,327		
<u>ROUNDED TO</u>				<u>\$89,000</u>		
<u>ROUNDED TO</u>				<u>\$105,000</u>		

Table C.32. "Apples to Apples" estimates — replace transformers to buildings (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing transformers</i>						
Remove old transformers	34	EA	\$197.00	\$6,737	020-708-1550	98 Heavy p. 34
Rubbish handling	36	CY	\$14.40	\$516	020-620-3080	98 Heavy p. 31
Haul debris to dump	36	CY	\$6.40	\$229	020-620-5000	98 Heavy p. 31
Disposal fee for debris	36	CY	\$6.00	\$215		BFI
<i>Install transformer pads</i>						
Grade soil	304	SY	\$3.03	\$921	025-122-0010	98 Heavy p. 73
Install pads	342	LF	\$26.50	\$9,063	A12.7-140-1580	98 Heavy p. 339
<i>Install transformer</i>						
Install transformer 300 KVA	34	EA	\$8,050.00	\$275,310	164-120-4300	98 Electrical p. 203
Install ground rod	34	EA	\$102.00	\$3,488	161-810-0050	98 Electrical p. 152
Install grounding wire	3	CLF	\$345.00	\$1,180	161-810-0280	98 Electrical p. 153
SUBTOTAL				\$289,962		
City cost index	86%					
TOTAL				\$248,208		
TOTAL with contingency of:	10%			\$273,029		
TOTAL with contingency of:	30%			\$322,670		
<u>ROUNDED TO</u>				<u>\$273,000</u>		
<u>ROUNDED TO</u>				<u>\$323,000</u>		

Table C.33. "CERL Scenario" estimates — replace transformers to buildings (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing transformers</i>						
Remove old transformers	26	EA	\$197.00	\$5,053	020-708-1550	98 Heavy p. 34
Rubbish handling	27	CY	\$14.40	\$387	020-620-3080	98 Heavy p. 31
Haul debris to dump	27	CY	\$6.40	\$172	020-620-5000	98 Heavy p. 31
Disposal fee for debris	27	CY	\$6.00	\$161		BFI
<i>Install transformer pads</i>						
Grade soil	228	SY	\$3.03	\$691	025-122-0010	98 Heavy p. 73
Install pads	257	LF	\$26.50	\$6,797	A12.7-140-1580	98 Heavy p. 339
<i>Install transformer</i>						
Install transformer 300 KVA	26	EA	\$8,050.00	\$206,483	164-120-3700	98 Electrical p. 203
Install ground rod	26	EA	\$102.00	\$2,616	161-810-0050	98 Electrical p. 152
Install grounding wire	3	CLF	\$345.00	\$885	161-810-0280	98 Electrical p. 153
SUBTOTAL				\$217,472		
City cost index	86%					
TOTAL				\$186,156		
TOTAL with contingency of:				\$204,771		
TOTAL with contingency of:				\$242,003		
<i>ROUNDED TO</i>				<i>\$205,000</i>		
<i>ROUNDED TO</i>				<i>\$242,000</i>		

Table C.34. "Apples to Apples" and "CERL Scenario" estimates — replace transformers to buildings (Phase 5).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Remove existing transformers</i>						
Remove old transformers	9	EA	\$197.00	\$1,684	020-708-1550	98 Heavy p. 34
Rubbish handling	9	CY	\$14.40	\$129	020-620-3080	98 Heavy p. 31
Haul debris to dump	9	CY	\$6.40	\$57	020-620-5000	98 Heavy p. 31
Disposal fee for debris	9	CY	\$6.00	\$54		BFI
<i>Install transformer pads</i>						
Grade soil	76	SY	\$3.03	\$230	025-122-0010	98 Heavy p. 73
Install pads	86	LF	\$26.50	\$2,266	A12.7-140-1580	98 Heavy p. 339
<i>Install transformer</i>						
Install transformer 300 KVA	9	EA	\$8,050.00	\$68,828	164-120-4300	98 Electrical p. 203
Install ground rod	9	EA	\$102.00	\$872	161-810-0050	98 Electrical p. 152
Install grounding wire	1	CLF	\$345.00	\$295	161-810-0280	98 Electrical p. 153
SUBTOTAL				\$72,491		
City cost index	86%					
TOTAL				\$62,052		
TOTAL with contingency of:	10%			\$68,257		
TOTAL with contingency of:	30%			\$80,668		
<i>ROUNDED TO</i>				<i>\$68,000</i>		
<i>ROUNDED TO</i>				<i>\$81,000</i>		

Table C.35. "Apples to Apples" estimates — install underground electrical lines (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install underground conductor						
Excavate utility trench	13,750	LF	\$0.74	\$10,175	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	13,750	LF	\$1.85	\$25,438	022-258-1450	98 Heavy p. 55
Install 8" diameter PVC Pipe	13,750	LF	\$13.35	\$183,563	026-678-2210	98 Heavy p. 88
Install 750 MCM conductor	500	CLF	\$900.00	\$450,000	161-150-5440	98 Electrical p. 143
Install new switching gear						
Install new disconnecting switches	3	EA	\$7,700.00	\$23,100	169-150-3350	98 Electrical p. 264
Lightning arresters	3	EA	\$1,125.00	\$3,375	169-150-8050	98 Electrical p. 264
Protective fuses	3	EA	\$1,450.00	\$4,350	169-150-8051	98 Electrical p. 264
Install switch	3	EA	\$980.00	\$2,940	169-130-0600	98 Electrical p. 262
SUBTOTAL						
City cost index	85.6%					
TOTAL				\$601,717		
TOTAL with contingency of:						
	10%		\$60,172	\$661,888		
TOTAL with contingency of:						
	30%		\$180,515	\$782,232		
ROUNDED TO						
				\$662,000		
ROUNDED TO						
				\$782,000		

Table C.36. "CERL Scenario" estimates — install underground electrical lines (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install underground conductor						
Excavate utility trench	5,500	LF	\$0.74	\$4,070	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	5,500	LF	\$1.85	\$10,175	022-258-1450	98 Heavy p. 55
Install 8" diameter PVC Pipe	5,500	LF	\$13.35	\$73,425	026-678-2210	98 Heavy p. 88
Install 750 MCM conductor	200	CLF	\$900.00	\$180,000	161-150-5440	98 Electrical p. 143
Install new switching gear						
Install new disconnecting switches	3	EA	\$7,700.00	\$23,100	169-150-3350	98 Electrical p. 264
Lightning arresters	3	EA	\$1,125.00	\$3,375	169-150-8050	98 Electrical p. 264
Protective fuses	3	EA	\$1,450.00	\$4,350	169-150-8051	98 Electrical p. 264
Install switch	3	EA	\$980.00	\$2,940	169-130-0600	98 Electrical p. 262
SUBTOTAL						
City cost index	85.6%					
TOTAL				\$301,435		
TOTAL with contingency of:						
	10%		\$25,803	\$283,831		
TOTAL with contingency of:						
	30%		\$77,409	\$335,437		
ROUNDED TO						
				\$284,000		
ROUNDED TO						
				\$335,000		

Table C.37. "Apples to Apples" estimates — install underground electrical lines (Phase 2).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install underground conductor</i>						
Excavate utility trench	5,500	LF	\$0.74	\$4,070	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	5,500	LF	\$1.85	\$10,175	022-258-1450	98 Heavy p. 55
Install 8" diameter PVC Pipe	5,500	LF	\$13.35	\$73,425	026-678-2210	98 Heavy p. 88
Install 750 MCM conductor	200	CLF	\$900.00	\$180,000	161-150-5440	98 Electrical p. 143
SUBTOTAL				\$267,670		
City cost index	85.6%					
TOTAL				\$229,126		
TOTAL with contingency of:	10%		\$22,913	\$252,038		
TOTAL with contingency of:	30%		\$68,738	\$297,863		
<u>ROUNDED TO</u>				<u>\$252,000</u>		
<u>ROUNDED TO</u>				<u>\$298,000</u>		

Table C.38. "CERL Scenario" estimates — install underground electrical lines (Phase 2).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install underground conductor</i>						
Excavate utility trench	2,750	LF	\$0.74	\$2,035	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	2,750	LF	\$1.85	\$5,088	022-258-1450	98 Heavy p. 55
Install 8" diameter PVC Pipe	2,750	LF	\$13.35	\$36,713	026-678-2210	98 Heavy p. 88
Install 750 MCM conductor	100	CLF	\$900.00	\$90,000	161-150-5440	98 Electrical p. 143
SUBTOTAL				\$133,835		
City cost index	85.6%					
TOTAL				\$114,563		
TOTAL with contingency of:	10%		\$11,456	\$126,019		
TOTAL with contingency of:	30%		\$34,369	\$148,932		
<u>ROUNDED TO</u>				<u>\$126,000</u>		
<u>ROUNDED TO</u>				<u>\$149,000</u>		

Table C.39. "Apples to Apples" and "CERL Scenario" estimates — replace meters to buildings (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Remove meters						
Remove meters	25	EA	\$50.50	\$1,263	020-708-1140	98 Electrical p. 20
Rubbish handling	2	CY	\$14.40	\$29	020-620-3080	98 Heavy p. 31
Haul debris to dump	2	CY	\$6.40	\$13	020-620-5000	98 Heavy p. 31
Disposal fee for debris	2	CY	\$6.00	\$12		BFI
Install meters						
Install meters	25	EA	\$2,425.00	\$60,625	163-240-2040	98 Electrical p. 184
Install main circuit breaker/safety switch	25	EA	\$1,850.00	\$46,250	163-360-4440	98 Electrical p. 199
SUBTOTAL				\$106,875		
City cost index	86%					
TOTAL				\$91,485		
TOTAL with contingency of:	10%			\$100,634		
TOTAL with contingency of:	30%			\$118,931		
ROUNDED TO				<u>\$101,000</u>		
ROUNDED TO				<u>\$119,000</u>		

Table C.40. "Apples to Apples" and "CERL Scenario" estimates — replace meters to buildings (Phase 2).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Remove meters						
Remove meters	10	EA	\$50.50	\$505	020-708-1140	98 Electrical p. 20
Rubbish handling	2	CY	\$14.40	\$29	020-620-3080	98 Heavy p. 31
Haul debris to dump	2	CY	\$6.40	\$13	020-620-5000	98 Heavy p. 31
Disposal fee for debris	2	CY	\$6.00	\$12		BFI
Install meters						
Install meters	10	EA	\$2,425.00	\$24,250	163-240-2040	98 Electrical p. 184
Install main circuit breaker/safety switch	10	EA	\$1,850.00	\$18,500	163-360-4440	98 Electrical p. 199
SUBTOTAL				\$42,750		
City cost index	86%					
TOTAL				\$36,594		
TOTAL with contingency of:	10%			\$40,253		
TOTAL with contingency of:	30%			\$47,572		
ROUNDED TO				<u>\$40,000</u>		
ROUNDED TO				<u>\$48,000</u>		

Table C.41. "CERL Scenario" estimates — install new natural gas lines (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	29,645	LF	\$1.41	\$41,799	020-728-0010	98 Heavy p. 38
Remove asphalt	2,470	SY	\$3.30	\$8,152	020-554-4000	98 Heavy p. 30
Rubbish handling	206	CY	\$14.40	\$2,965	020-620-3080	98 Heavy p. 31
Haul debris to dump	206	CY	\$6.40	\$1,318	020-620-5000	98 Heavy p. 31
Disposal fee for debris	206	CY	\$6.00	\$1,235		BFI
Install asphalt	2,470	SY	\$5.30	\$13,093	025-104-0160	98 Heavy p. 72
Excavate trench	14,823	LF	\$0.58	\$8,597	022-258-2450	98 Site p. 50
Backfill/compact trench	14,823	LF	\$1.26	\$18,676	022-258-1350	98 Site p. 50
Install pipe bedding	14,823	LF	\$1.93	\$28,607	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	0	LF	\$18.25	\$0	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	10,450	LF	\$9.60	\$100,320	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	1,430	LF	\$3.34	\$4,776	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	1,155	LF	\$2.83	\$3,269	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	440	LF	\$2.37	\$1,043	026-854-1000	98 Site p. 90
Total					\$233,851	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
Total					\$92,750	
Install regulator station						
Install main pressure regulator	2	EA	\$16,200.00	\$32,400	026-858-0840	98 Site p. 92
Install sniffer	2	EA	\$15,000.00	\$30,000	153-160-2700	98 Site p. 296
Install building for station	1	EA	\$20,900.00	\$20,900	131-242-0750	98 Site p. 250
Install shut off valves	4	EA	\$1,900.00	\$7,600	151-980-2070	98 Site p. 291
Install detection system	1	EA	\$3,525.00	\$3,525	168-120-6800	98 Elect p. 249
Fire protection system	1	EA	\$15,000.00	\$15,000		
Total						
SUBTOTAL				\$436,026		
City cost index	85.6%					
TOTAL				\$373,238		
TOTAL with contingency of:	10%		\$37,324	\$410,562		
TOTAL with contingency of:	30%		\$111,971	\$485,209		
ROUNDED TO				\$411,000		
ROUNDED TO				\$485,000		

Table C.42. "CERL Scenario" estimates — install new natural gas lines (Phase 2).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	34,001	LF	\$1.41	\$47,941	020-728-0010	98 Heavy p. 38
Remove asphalt	2,833	SY	\$3.30	\$9,350	020-554-4000	98 Heavy p. 30
Rubbish handling	236	CY	\$14.40	\$3,400	020-620-3080	98 Heavy p. 31
Haul debris to dump	236	CY	\$6.40	\$1,511	020-620-5000	98 Heavy p. 31
Disposal fee for debris	236	CY	\$6.00	\$1,417		BFI
Install asphalt	2,833	SY	\$5.30	\$15,017	025-104-0160	98 Heavy p. 72
Excavate trench	17,001	LF	\$0.58	\$9,860	022-258-2450	98 Site p. 50
Backfill/compact trench	17,001	LF	\$1.26	\$21,421	022-258-1350	98 Site p. 50
Install pipe bedding	17,001	LF	\$1.93	\$32,811	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	0	LF	\$18.25	\$0	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	12,650	LF	\$9.60	\$121,440	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	1,705	LF	\$3.34	\$5,695	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	770	LF	\$2.83	\$2,179	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	330	LF	\$2.37	\$782	026-854-1000	98 Site p. 90
Total					\$272,825	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
Total						
SUBTOTAL				\$365,575		
City cost index	85.6%					
TOTAL				\$312,932		
TOTAL with contingency of:	10%		\$31,293	\$344,225		
TOTAL with contingency of:	30%		\$93,880	\$406,811		
ROUNDED TO				\$344,000		
ROUNDED TO				\$407,000		

Table C.43. "CERL Scenario" estimates — install new natural gas lines (Phase 3).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	55,007	LF	\$1.41	\$77,559	020-728-0010	98 Heavy p. 38
Remove asphalt	4,584	SY	\$3.30	\$15,127	020-554-4000	98 Heavy p. 30
Rubbish handling	382	CY	\$14.40	\$5,501	020-620-3080	98 Heavy p. 31
Haul debris to dump	382	CY	\$6.40	\$2,445	020-620-5000	98 Heavy p. 31
Disposal fee for debris	382	CY	\$6.00	\$2,292		BFI
Install asphalt	4,584	SY	\$5.30	\$24,295	025-104-0160	98 Heavy p. 72
Excavate trench	27,503	LF	\$0.58	\$15,952	022-258-2450	98 Site p. 50
Backfill/compact trench	27,503	LF	\$1.26	\$34,654	022-258-1350	98 Site p. 50
Install pipe bedding	27,503	LF	\$1.93	\$53,081	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	5,115	LF	\$18.25	\$93,349	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	11,330	LF	\$9.60	\$108,768	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	5,500	LF	\$3.34	\$18,370	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	2,728	LF	\$2.83	\$7,720	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	330	LF	\$2.83	\$934	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	0	LF	\$2.37	\$0	026-854-1000	98 Site p. 90
Total					\$460,046	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
Total						
SUBTOTAL				\$552,796		
City cost index	85.6%					
TOTAL				\$473,194		
TOTAL with contingency of:	10%		\$47,319	\$520,513		
TOTAL with contingency of:	30%		\$141,958	\$615,152		
ROUNDED TO				\$521,000		
ROUNDED TO				\$615,000		

Table C.44. "CERL Scenario" estimates — install new natural gas lines (Phase 6).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	11,374	LF	\$1.41	\$16,037	020-728-0010	98 Heavy p. 38
Remove asphalt	948	SY	\$3.30	\$3,128	020-554-4000	98 Heavy p. 30
Rubbish handling	79	CY	\$14.40	\$1,137	020-620-3080	98 Heavy page 31
Haul debris to dump	79	CY	\$6.40	\$506	020-620-5000	98 Heavy page 31
Disposal fee for debris	79	CY	\$6.00	\$474		BFI
Install asphalt	948	SY	\$5.30	\$5,024	025-104-0160	98 Heavy p. 72
Excavate trench	5,687	LF	\$0.58	\$3,298	022-258-2450	98 Site p. 50
Backfill/compact trench	5,687	LF	\$1.26	\$7,166	022-258-1350	98 Site p. 50
Install pipe bedding	5,687	LF	\$1.93	\$10,976	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	2,970	LF	\$18.25	\$54,203	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	0	LF	\$9.60	\$0	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	2,200	LF	\$3.34	\$7,348	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	0	LF	\$2.37	\$0	026-854-1000	98 Site p. 90
Total					\$109,296	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
Total						
SUBTOTAL				\$202,046		
City cost index	85.6%					
TOTAL				\$172,951		
TOTAL with contingency of:	10%		\$17,295	\$190,247		
TOTAL with contingency of:	30%		\$51,885	\$224,837		
ROUNDED TO				\$190,000		
ROUNDED TO				\$225,000		

Table C.45. "Apples to Apples" estimates — install new natural gas lines (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	7,411	LF	\$1.41	\$10,450	020-728-0010	98 Heavy p. 38
Remove asphalt	618	SY	\$3.30	\$2,038	020-554-4000	98 Heavy p. 30
Rubbish handling	51	CY	\$14.40	\$741	020-620-3080	98 Heavy page 31
Haul debris to dump	51	CY	\$6.40	\$329	020-620-5000	98 Heavy page 31
Disposal fee for debris	51	CY	\$6.00	\$309		BFI
Install asphalt	618	SY	\$5.30	\$3,273	025-104-0160	98 Heavy p. 72
Excavate trench	3,706	LF	\$0.58	\$2,149	022-258-2450	98 Site p. 50
Backfill/compact trench	3,706	LF	\$1.26	\$4,669	022-258-1350	98 Site p. 50
Install pipe bedding	3,706	LF	\$1.93	\$7,152	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	0	LF	\$18.25	\$0	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	2,613	LF	\$9.60	\$25,080	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	358	LF	\$3.34	\$1,194	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	289	LF	\$2.83	\$817	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	110	LF	\$2.37	\$261	026-854-1000	98 Site p. 90
Total					\$58,463	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
Total						
SUBTOTAL				\$151,213		
City cost index	85.6%					
TOTAL				\$129,438		
TOTAL with contingency of:	10%		\$12,944	\$142,382		
TOTAL with contingency of:	30%		\$38,831	\$168,269		
ROUNDED TO				\$142,000		
ROUNDED TO				\$168,000		

Table C.46. "Apples to Apples" estimates — install new natural gas lines (Phase 2).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	8,500	LF	\$1.41	\$11,985	020-728-0010	98 Heavy p. 38
Remove asphalt	708	SY	\$3.30	\$2,338	020-554-4000	98 Heavy p. 30
Rubbish handling	59	CY	\$14.40	\$850	020-620-3080	98 Heavy page 31
Haul debris to dump	59	CY	\$6.40	\$378	020-620-5000	98 Heavy page 31
Disposal fee for debris	59	CY	\$6.00	\$354		BFI
Install asphalt	708	SY	\$5.30	\$3,754	025-104-0160	98 Heavy p. 72
Excavate trench	4,250	LF	\$0.58	\$2,465	022-258-2450	98 Site p. 50
Backfill/compact trench	4,250	LF	\$1.26	\$5,355	022-258-1350	98 Site p. 50
Install pipe bedding	4,250	LF	\$1.93	\$8,203	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	0	LF	\$18.25	\$0	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	3,163	LF	\$9.60	\$30,360	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	426	LF	\$3.34	\$1,424	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	193	LF	\$2.83	\$545	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	83	LF	\$2.37	\$196	026-854-1000	98 Site p. 90
Total					\$68,206	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
Total						
SUBTOTAL				\$160,956		
City cost index	85.6%					
TOTAL				\$137,778		
TOTAL with contingency of:	10%		\$13,778	\$151,556		
TOTAL with contingency of:	30%		\$41,334	\$179,112		
ROUNDED TO				\$152,000		
ROUNDED TO				\$179,000		

Table C.47. "Apples to Apples" estimates — install new natural gas lines (Phase 3).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	13,752	LF	\$1.41	\$19,390	020-728-0010	98 Heavy p. 38
Remove asphalt	1,146	SY	\$3.30	\$3,782	020-554-4000	98 Heavy p. 30
Rubbish handling	95	CY	\$14.40	\$1,375	020-620-3080	98 Heavy page 31
Haul debris to dump	95	CY	\$6.40	\$611	020-620-5000	98 Heavy page 31
Disposal fee for debris	95	CY	\$6.00	\$573		BFI
Install asphalt	1,146	SY	\$5.30	\$6,074	025-104-0160	98 Heavy p. 72
Excavate trench	6,876	LF	\$0.58	\$3,988	022-258-2450	98 Site p. 50
Backfill/compact trench	6,876	LF	\$1.26	\$8,664	022-258-1350	98 Site p. 50
Install pipe bedding	6,876	LF	\$1.93	\$13,270	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	1,279	LF	\$18.25	\$23,337	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	2,833	LF	\$9.60	\$27,192	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	1,375	LF	\$3.34	\$4,593	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	682	LF	\$2.83	\$1,930	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	83	LF	\$2.83	\$233	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	0	LF	\$2.37	\$0	026-854-1000	98 Site p. 90
Total					\$115,012	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
SUBTOTAL				\$207,762		
City cost index	85.6%					
TOTAL				\$177,844		
TOTAL with contingency of:	10%		\$17,784	\$195,628		
TOTAL with contingency of:	30%		\$53,353	\$231,197		
ROUNDED TO				\$196,000		
ROUNDED TO				\$231,000		

Table C.48. "Apples to Apples" estimates — install new natural gas lines (Phases 4 and 5).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	7,411	LF	\$1.41	\$10,450	020-728-0010	98 Heavy p. 38
Remove asphalt	618	SY	\$3.30	\$2,038	020-554-4000	98 Heavy p. 30
Rubbish handling	51	CY	\$14.40	\$741	020-620-3080	98 Heavy p. 31
Haul debris to dump	51	CY	\$6.40	\$329	020-620-5000	98 Heavy p. 31
Disposal fee for debris	51	CY	\$6.00	\$309		BFI
Install asphalt	618	SY	\$5.30	\$3,273	025-104-0160	98 Heavy p. 72
Excavate trench	3,706	LF	\$0.58	\$2,149	022-258-2450	98 Site p. 50
Backfill/compact trench	3,706	LF	\$1.26	\$4,669	022-258-1350	98 Site p. 50
Install pipe bedding	3,706	LF	\$1.93	\$7,152	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	0	LF	\$18.25	\$0	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	2,613	LF	\$9.60	\$25,080	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	358	LF	\$3.34	\$1,194	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	289	LF	\$2.83	\$817	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	110	LF	\$2.37	\$261	026-854-1000	98 Site p. 90
Total					\$58,463	
Install flowmeters						
Install 3" meters	25	EA	\$3,425.00	\$85,625	153-160-2640	98 Site p. 296
Install regulators for meters	25	EA	\$285.00	\$7,125	026-858-0680	98 Site p. 92
SUBTOTAL				\$151,213		
City cost index	85.6%					
TOTAL				\$129,438		
TOTAL with contingency of:	10%		\$12,944	\$142,382		
TOTAL with contingency of:	30%		\$38,831	\$168,269		
ROUNDED TO				\$142,000		
ROUNDED TO				\$168,000		

Table C.49. "Apples to Apples" estimates — install new natural gas lines (Phase 6).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Saw cut asphalt	5,566	LF	\$1.41	\$7,848	020-728-0010	98 Heavy p. 38
Remove asphalt	464	SY	\$3.30	\$1,531	020-554-4000	98 Heavy p. 30
Rubbish handling	39	CY	\$14.40	\$557	020-620-3080	98 Heavy p. 31
Haul debris to dump	39	CY	\$6.40	\$247	020-620-5000	98 Heavy p. 31
Disposal fee for debris	39	CY	\$6.00	\$232		BFI
Install asphalt	464	SY	\$5.30	\$2,458	025-104-0160	98 Heavy p. 72
Excavate trench	2,783	LF	\$0.58	\$1,614	022-258-2450	98 Site p. 50
Backfill/compact trench	2,783	LF	\$1.26	\$3,507	022-258-1350	98 Site p. 50
Install pipe bedding	2,783	LF	\$1.93	\$5,371	022-258-1351	98 Site p. 375
Install 6" diameter plastic pipe	1,430	LF	\$18.25	\$26,098	026-854-1600	98 Site p. 90
Install 4" diameter plastic pipe	0	LF	\$9.60	\$0	026-854-1540	98 Site p. 90
Install 2" diameter plastic pipe	1,100	LF	\$3.34	\$3,674	026-854-1160	98 Site p. 90
Install 1-1/4" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 1" diameter plastic pipe	0	LF	\$2.83	\$0	026-854-1040	98 Site p. 90
Install 5/8" diameter plastic pipe	0	LF	\$2.37	\$0	026-854-1000	98 Site p. 90
SUBTOTAL				\$53,136		
City cost index	85.6%					
TOTAL				\$45,485		
TOTAL with contingency of:	10%		\$4,548	\$50,033		
TOTAL with contingency of:	30%		\$13,645	\$59,130		
ROUNDED TO				\$50,000		
ROUNDED TO				\$59,000		

Table C.50. "Apples to Apples" estimates — install underground phone lines (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install underground conductor						
Excavate utility trench	16,500	LF	\$0.74	\$12,210	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	16,500	LF	\$1.85	\$30,525	022-258-1450	98 Heavy p. 55
Install telephone lines	300	CLF	\$340.00	\$102,000	161-155-6400	98 Elect p. 144
SUBTOTAL				\$144,735		
City cost index	85.6%					
TOTAL				\$123,893		
TOTAL with contingency of:	10%		\$12,389	\$136,282		
TOTAL with contingency of:	30%		\$37,168	\$161,061		
ROUNDED TO				\$136,000		
ROUNDED TO				\$161,000		

Table C.51. "Apples to Apples" estimates — install underground phone lines (Phases 2, 3, and 4).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install underground conductor</i>						
Excavate utility trench	11,000	LF	\$0.74	\$8,140	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	11,000	LF	\$1.85	\$20,350	022-258-1450	98 Heavy p. 55
Install telephone lines	200	CLF	\$340.00	\$68,000	161-155-6400	98 Elect p. 144
Total				\$96,490		
SUBTOTAL				\$96,490		
City cost index	85.6%					
TOTAL				\$82,595		
TOTAL with contingency of:	10%		\$8,260	\$90,855		
TOTAL with contingency of:	30%		\$24,779	\$107,374		
<u>ROUNDED TO</u>				\$91,000		
<u>ROUNDED TO</u>				\$107,000		

Table C.52. "Apples to Apples" estimates — Install underground phone lines (Phase 6).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install underground conductor</i>						
Excavate utility trench	22,000	LF	\$0.74	\$16,280	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	22,000	LF	\$1.85	\$40,700	022-258-1450	98 Heavy p. 55
Install telephone lines	400	CLF	\$340.00	\$136,000	161-155-6400	98 Elect p. 144
SUBTOTAL				\$192,980		
City cost index	85.6%					
TOTAL				\$165,191		
TOTAL with contingency of:	10%		\$16,519	\$181,710		
TOTAL with contingency of:	30%		\$49,557	\$214,748		
<u>ROUNDED TO</u>				\$182,000		
<u>ROUNDED TO</u>				\$215,000		

Table C.53. "CERL Scenario" estimates — install underground phone lines (Phase 1).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install underground conductor</i>						
Excavate utility trench	5,500	LF	\$0.74	\$4,070	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	5,500	LF	\$1.85	\$10,175	022-258-1450	98 Heavy p. 55
Install telephone lines	100	CLF	\$340.00	\$34,000	161-155-6400	98 Elect p. 144
SUBTOTAL				\$48,245		
City cost index	85.6%					
TOTAL				\$41,298		
TOTAL with contingency of:	10%		\$4,130	\$45,427		
TOTAL with contingency of:	30%		\$12,389	\$53,687		
<u>ROUNDED TO</u>				<u>\$45,000</u>		
<u>ROUNDED TO</u>				<u>\$54,000</u>		

Table C.54. "CERL Scenario" estimates — install underground phone lines (Phases 2, 3, and 4).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install underground conductor</i>						
Excavate utility trench	3,300	LF	\$0.74	\$2,442	022-258-2250	98 Heavy p. 55
Backfill and compact utility trench	3,300	LF	\$1.85	\$6,105	022-258-1450	98 Heavy p. 55
Install telephone lines	60	CLF	\$340.00	\$20,400	161-155-6400	98 Elect p. 144
SUBTOTAL				\$28,947		
City cost index	85.6%					
TOTAL				\$24,779		
TOTAL with contingency of:	10%		\$2,478	\$27,256		
TOTAL with contingency of:	30%		\$7,434	\$32,212		
<u>ROUNDED TO</u>				<u>\$27,000</u>		
<u>ROUNDED TO</u>				<u>\$32,000</u>		

Table C.55. "Apples to Apples" and "CERL Scenario" estimates — building fit-up.

				WH Fit-up	WH Loading	WH Office	#144 Interior Refit	ADA
				Lighting	Docks	Fit-up		
SUMMARY								
Bldg #144	109,663	(SQF)						
WWII	1,759,296	(SQF)	\$3,254,622	\$360,020	\$264,080	\$100,286		
Korean	829,576	(SQF)	\$74,480	\$-	\$131,412	\$63,620		
Totals			\$3,329,102	\$360,020	\$395,492	\$163,906	\$490,415	
Unit Costs / SQF								
Bldg #144	109,663	(SQF)						\$4.47
WWII	1,759,296	(SQF)	\$1.85	\$0.20	\$0.15	\$0.06		
Korean	829,576	(SQF)	\$0.09		\$0.16	\$0.08		
All WH	2,588,872	(SQF)	\$1.29	\$0.14	\$0.15	\$0.06		
				Phase 2	Phase 3	94% CERL - Phase 1 Low	112% High	94% CERL - Phase 2 Low
CERL Scenario		LRA Phase 1						
Bldg #144 Code Compliance		\$100,000		\$-	\$-	139,776	\$165,190	
	% Total per phase	100%						
Bldg #144 Fire Suppression		\$200,000		\$-	\$-	155,027	\$183,213	
	% Total per phase	100%						
Typ 20 Code Compliance		\$400,000		\$450,000	\$-	\$-	\$-	
	% Total per phase	47%		53%				
Typ 20 Fire Suppression		\$1,200,000		\$1,800,000	\$-	\$149,586	\$176,784	
	% Total per phase	43%		57%				
Typ 20 Enhancements		\$1,500,000		\$1,500,000	\$750,000	\$1,629,626	\$1,925,922	
	% Total per phase	40%		40%	20%			
Korean Code Compliance		\$300,000		\$150,000	\$-	\$-	\$-	
	% Total per phase	67%		33%				
Korean Fire Suppression		\$1,800,000		\$400,000	\$-	\$182,306	\$215,452	
	% Total per phase	82%		18%		\$273,458	\$323,178	
Korean Enhancements		\$300,000		\$100,000	\$-	293,138	346,436	
	% Total per phase	75%		25%		\$439,707	\$519,654	
Bldg #835 Code Compliance		\$50,000		\$-	\$-	\$-	\$-	
	% Total per phase	100%						
Bldg #925 Code Compliance		\$-		\$-	\$-	\$-	\$-	
	% Total per phase							
		\$5,850,000		\$4,200,000	\$750,000	\$2,549,459	\$3,012,997	
					\$10,800,000			
Notes:								
1. Code compliance is not specified by LRA anywhere.								
#144 added ada, fire, elec & mech								
#835 & #925 added nothing								
2. LRA includes McCauley Candle Factory - can therefore reduce their Korean numbers by 33.33%.								
Korean X								
LRA -Korean w/o Candle Factory								
Phase 1								
Korean Code Compliance		\$200,000		67%		CERL - Phase 1 Low	High	CERL - Phase 2 Low
				Phase 2	total			
				\$100,000	\$300,000	\$-	\$-	
Korean Fire Suppression		\$1,200,000		\$266,667	\$1,466,667	\$189,339	\$223,764	
Korean Enhancements		\$200,000		\$66,667	\$266,667	\$165,296	\$195,350	
					\$2,033,333			
3. Building Fit-Up Totals now include waste disposal as calculated by Jane DeRose.								
4. All CERL totals adjusted by RS Means weighted average City Cost Index of 0.859, Facilities Construction 1998, p1095.								
5. CERL Low and High Estimates based on 110% and 130% contingency scaling factors.								
Building Enhancements - Waste Disposal Costs								
Totals	per SQF				CY	Disposal Cost		
\$791,201	\$7.21	Bldg #144	109,663	(SQF)	438.652	\$11,208		
\$4,321,426	\$2.46	WWII	1,759,296	(SQF)	7037.184	\$179,800		
\$413,715	\$0.50	Korean	829,576	(SQF)	3318.304	\$84,783		
\$2,588,872	\$1.83	All WH	2,588,872	(SQF)	10355.488	\$264,583		

WH Fit-up	WH Loading	WH Office	#144 Interior Refit	ADA	Fire Protection	#144 Fit-up Mechanical	#144 Fit-up Electrical	Totals	Totals	per SQF	Bldg #144
Lighting	Docks	Fit-up									WWII
\$360,020	\$264,080	\$100,286			\$30,413	\$158,463	\$100,000	\$11,910	\$300,786	\$791,201	\$2.74
\$-	\$131,412	\$63,620				\$342,418			\$4,321,426	\$4,321,426	\$2.46
\$360,020	\$395,482	\$163,906	\$490,415		\$30,413	\$210,376	\$100,000	\$11,910	\$479,888	\$479,888	\$0.58
						\$711,258			\$5,592,514	\$5,592,514	Korean

								Unit Costs	Unit Costs	Bldg #144	109,663
										WWII	1,759,296
\$0.20	\$0.15	\$0.06	\$4.47	\$0.28	\$1.45	\$0.91	\$0.11	\$2.74	\$2.46	Korean	829,576
\$0.14	\$0.15	\$0.06			\$0.25			\$0.58	\$0.58	All WH	2,588,872
					\$0.21			\$1.85	\$1.85		

Phase 2	Phase 3	94% CERL - Phase 1 Low	112% High	94% CERL - Phase 2 Low	112% High	94% CERL - Phase 3 Low	112% High	CERL Scenario Totals LRA	CERL Low	CERL High
\$-	\$-	138,776	\$165,190	\$-	\$-	\$-	\$-	\$100,000	\$-	\$-
\$-	\$-	\$155,027	\$183,213	\$-	\$-	\$-	\$-	\$200,000	\$-	\$-
\$450,000	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$850,000	\$-	\$-
53%										
\$1,600,000	\$-	\$149,586	\$176,784	\$199,449	\$235,712	\$-	\$-	\$2,800,000	\$349,035	\$412,496
57%										
\$1,500,000	\$750,000	\$1,629,626	\$1,925,922	\$1,629,626	\$1,925,922	\$814,813	\$962,961	\$3,750,000	\$4,074,066	\$4,814,805
40%	20%									
\$150,000	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$450,000	\$-	\$-
33%										
\$400,000	\$-	\$182,306	\$215,452	\$40,512	\$47,878	\$-	\$-	\$2,200,000	\$222,818	\$263,330
18%										
\$100,000	\$-	\$273,458	\$323,178	\$80,769	\$71,817	\$-	\$-	\$400,000	\$334,227	\$394,996
25%										
\$-	\$-	\$293,138	\$346,436	\$97,713	\$115,479	\$-	\$-	\$50,000	\$390,851	\$461,914
\$-	\$-	\$438,707	\$519,654	\$146,569	\$173,218	\$-	\$-	\$-	\$586,276	\$692,872
\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
\$4,200,000	\$750,000	\$2,549,459	\$3,012,997	\$1,967,300	\$2,324,991	\$814,813	\$962,961	\$10,800,000	\$5,036,770	\$5,952,546
	\$10,800,000								\$5,957,273	\$7,040,413

Adjusted by factor of 1.5 to represent all six Korean bldgs (only 4 were modeled)

67%		CERL - Phase 1		CERL - Phase 2		CERL - Total (Korean)	
Phase 2	total	Low	High	Low	High	Low	High
\$100,000	\$300,000	\$-	\$-	\$-	\$-	\$-	\$-
\$266,667	\$1,466,667	\$189,339	\$223,764	\$42,075	\$49,725	\$231,414	\$273,489
\$66,667	\$266,667	\$165,296	\$195,350	\$84,704	\$100,104	\$249,999	\$295,454
	\$2,033,333					\$481,413	\$568,943

	CY	Disposal Cost
(SQF)	438,652	\$11,208
(SQF)	7037,184	\$179,800
(SQF)	3318,304	\$84,783
(SQF)	10355,488	\$264,583

2

#144 Fit-up	#144 Fit-up						
Mechanical	Electrical	Totals	Totals	per SQF			
\$100,000	\$11,910	\$300,786	\$791,201	\$2.74	Bldg #144	109,663	(SQF)
		\$4,321,426	\$4,321,426	\$2.46	WWII	1,759,296	(SQF)
		\$479,888	\$479,888	\$0.58	Korean	829,576	(SQF)
\$100,000	\$11,910	\$5,592,514	\$5,592,514				

		Unit Costs	Unit Costs				
\$0.91	\$0.11	\$2.74	\$7.21	Bldg #144	109,663	(SQF)	
		\$2.46	\$2.46	WWII	1,759,296	(SQF)	
		\$0.58	\$0.58	Korean	829,576	(SQF)	
		\$1.85	\$1.85	All WH	2,588,872	(SQF)	

94% CERL - Phase 3 Low	112% High	CERL Scenario Totals LRA	CERL Low	CERL High
\$-	\$-	\$100,000	\$-	\$-
\$-	\$-	\$200,000	\$-	\$-
\$-	\$-	\$850,000	\$-	\$-
\$-	\$-	\$2,800,000	\$349,035	\$412,496
\$814,813	\$962,961	\$3,750,000	\$4,074,066	\$4,814,805
\$-	\$-	\$450,000	\$-	\$-
\$-	\$-	\$2,200,000	\$222,818	\$263,330
\$-	\$-		\$334,227	\$394,996
\$-	\$-	\$400,000	\$390,851	\$461,914
\$-	\$-		\$586,276	\$692,872
\$-	\$-	\$50,000	\$-	\$-
\$-	\$-	\$-	\$-	\$-
\$814,813	\$962,961	\$10,800,000	\$5,036,770	\$5,952,546
			\$5,957,273	\$7,040,413

CERL - Total (Korean)		High
Low		
\$-	\$-	
\$231,414	\$273,489	
\$249,999	\$285,454	
\$481,413	\$568,943	

Table C.56. "Apples to Apples" estimates — Phase 1: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	5,610	LF	\$13.80	\$77,418	A12.3-110-1440	98 Site p. 372
Install 12" pipe bedding	2,750	LF	\$2.03	\$5,583	A12.3-310-1500	98 Site p. 375
Install 16" pipe bedding	1,870	LF	\$3.43	\$6,414	A12.3-310-1560	98 Site p. 375
Install 18" pipe bedding	990	LF	\$3.50	\$3,465	A12.3-310-1580	98 Site p. 375
Install 12" diameter black steel pipe	2,750	LF	\$28.50	\$78,375	026-660-1020	98 Site p. 82
Install 16" diameter black steel pipe	1,870	LF	\$35.00	\$65,450	estimated	
Install 18" diameter black steel pipe	990	LF	\$37.00	\$36,630	026-660-1030	98 Site p. 82
Total					\$273,335	
Repair roadway						
Install and compact 6" crushed stone base material	2,493	SY	\$0.20	\$499	022-226-5020	98 Site p. 44
Install 3" binder course	2,493	SY	\$5.30	\$13,215	025-104-0160	98 Site p. 67
Install 3" wearing course	2,493	SY	\$6.20	\$15,459	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	2,493	CY	\$0.47	\$1,172	022-226-5020	96 Site & Work
Total					\$30,344	
SUBTOTAL				\$303,678		
City cost index	85.60%					
TOTAL				\$259,949		
TOTAL with contingency of:	10%		\$25,995	\$285,944		
TOTAL with contingency of:	30%		\$77,985	\$337,933		
ROUNDED TO				\$286,000		
ROUNDED TO				\$338,000		

Table C.57. "CERL Scenario" estimates — Phase 1: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	3,960	LF	\$13.80	\$54,648	A12.3-110-1440	98 Site p. 372
Install 8" pipe bedding	2,200	LF	\$1.93	\$4,246	A12.3-310-1460	98 Site p. 375
Install 10" pipe bedding	1,320	LF	\$1.97	\$2,600	A12.3-310-1480	98 Site p. 375
Install 12" pipe bedding	440	LF	\$2.03	\$893	A12.3-310-1500	98 Site p. 375
Install 8" diameter black steel pipe	2,200	LF	\$38.50	\$84,700	026-660-1000	98 Site p. 82
Install 10" diameter black steel pipe	1,320	LF	\$42.00	\$55,440	026-660-1010	98 Site p. 82
Install 12" diameter black steel pipe	440	LF	\$28.50	\$12,540	026-660-1020	98 Site p. 82
Total					\$215,068	
Repair roadway						
Install and compact 6" crushed stone base material	1,760	SY	\$0.20	\$352	022-226-5020	98 Site p. 44
Install 3" binder course	1,760	SY	\$5.30	\$9,328	025-104-0160	98 Site p. 67
Install 3" wearing course	1,760	SY	\$6.20	\$10,912	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	1,760	CY	\$0.47	\$827	022-226-5020	96 Site & Work
Total					\$21,419	
SUBTOTAL				\$236,487		
City cost index	85.60%					
TOTAL				\$202,433		
TOTAL with contingency of:	10%		\$20,243	\$222,676		
TOTAL with contingency of:	30%		\$60,730	\$263,163		
ROUNDED TO				\$223,000		
ROUNDED TO				\$263,000		

Table C.58. "Apples to Apples" estimates — Phase 2: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	2,420	LF	\$13.80	\$33,396	A12.3-110-1440	98 Site p. 372
Install 12" pipe bedding	1,650	LF	\$2.03	\$3,350	A12.3-310-1500	98 Site p. 375
Install 16" pipe bedding	770	LF	\$3.43	\$2,641	A12.3-310-1560	98 Site p. 375
Install 18" pipe bedding	0	LF	\$3.50	\$0	A12.3-310-1580	98 Site p. 375
Install 12" diameter black steel pipe	1,650	LF	\$28.50	\$47,025	026-660-1020	98 Site p. 82
Install 16" diameter black steel pipe	770	LF	\$35.00	\$26,950	estimated	
Install 18" diameter black steel pipe	0	LF	\$37.00	\$0	026-660-1030	98 Site p. 82
Total					\$113,362	
Repair roadway						
Install and compact 6" crushed stone base material	1,076	SY	\$0.20	\$215	022-226-5020	98 Site p. 44
Install 3" binder course	1,076	SY	\$5.30	\$5,700	025-104-0160	98 Site p. 67
Install 3" wearing course	1,076	SY	\$6.20	\$6,668	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	1,076	CY	\$0.47	\$506	022-226-5020	96 Site & Work
Total					\$13,090	
SUBTOTAL				\$126,451		
City cost index	85.60%					
TOTAL				\$108,242		
TOTAL with contingency of:	10%		\$10,824	\$119,066		
TOTAL with contingency of:	30%		\$32,473	\$140,715		
ROUNDED TO				\$119,000		
ROUNDED TO				\$141,000		

Table C.59. "CERL Scenario" estimates — Phase 2: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	1,760	LF	\$13.80	\$24,288	A12.3-110-1440	98 Site p. 372
Install 8" pipe bedding	1,320	LF	\$1.93	\$2,548	A12.3-310-1460	98 Site p. 375
Install 10" pipe bedding	440	LF	\$1.97	\$867	A12.3-310-1480	98 Site p. 375
Install 12" pipe bedding	0	LF	\$2.03	\$0	A12.3-310-1500	98 Site p. 375
Install 8" diameter black steel pipe	1,320	LF	\$38.50	\$50,820	026-660-1000	98 Site p. 82
Install 10" diameter black steel pipe	440	LF	\$42.00	\$18,480	026-660-1010	98 Site p. 82
Install 12" diameter black steel pipe	0	LF	\$28.50	\$0	026-660-1020	98 Site p. 82
Total					\$97,002	
Repair roadway						
Install and compact 6" crushed stone base material	782	SY	\$0.20	\$156	022-226-5020	98 Site p. 44
Install 3" binder course	782	SY	\$5.30	\$4,146	025-104-0160	98 Site p. 67
Install 3" wearing course	782	SY	\$6.20	\$4,850	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	782	CY	\$0.47	\$368	022-226-5020	96 Site & Work
Total					\$9,520	
SUBTOTAL				\$106,522		
City cost index	85.60%					
TOTAL				\$91,183		
TOTAL with contingency of:	10%		\$9,118	\$100,301		
TOTAL with contingency of:	30%		\$27,355	\$118,538		
ROUNDED TO				\$100,000		
ROUNDED TO				\$119,000		

Table C.60. "Apples to Apples" estimates — Phase 3: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	4,785	LF	\$13.80	\$66,033	A12.3-110-1440	98 Site p. 372
Install 12" pipe bedding	2,475	LF	\$2.03	\$5,024	A12.3-310-1500	98 Site p. 375
Install 16" pipe bedding	1,595	LF	\$3.43	\$5,471	A12.3-310-1560	98 Site p. 375
Install 18" pipe bedding	715	LF	\$3.50	\$2,503	A12.3-310-1580	98 Site p. 375
Install 12" diameter black steel pipe	2,475	LF	\$28.50	\$70,538	026-660-1020	98 Site p. 82
Install 16" diameter black steel pipe	1,595	LF	\$35.00	\$55,825	estimated	
Install 18" diameter black steel pipe	715	LF	\$37.00	\$26,455	026-660-1030	98 Site p. 82
Total					\$231,848	
Repair roadway						
Install and compact 6" crushed stone base material	2,127	SY	\$0.20	\$425	022-226-5020	98 Site p. 44
Install 3" binder course	2,127	SY	\$5.30	\$11,271	025-104-0160	98 Site p. 67
Install 3" wearing course	2,127	SY	\$6.20	\$13,185	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	2,127	CY	\$0.47	\$1,000	022-226-5020	96 Site & Work
Total					\$25,882	
SUBTOTAL				\$257,730		
City cost index	85.60%					
TOTAL				\$220,617		
TOTAL with contingency of:	10%		\$22,062	\$242,678		
TOTAL with contingency of:	30%		\$66,185	\$286,802		
ROUNDED TO				\$243,000		
ROUNDED TO				\$287,000		

Table C.61. "CERL Scenario" estimates — Phase 3: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	3,300	LF	\$13.80	\$45,540	A12.3-110-1440	98 Site p. 372
Install 8" pipe bedding	1,980	LF	\$1.93	\$3,821	A12.3-310-1460	98 Site p. 375
Install 10" pipe bedding	1,100	LF	\$1.97	\$2,167	A12.3-310-1480	98 Site p. 375
Install 12" pipe bedding	220	LF	\$2.03	\$447	A12.3-310-1500	98 Site p. 375
Install 8" diameter black steel pipe	1,980	LF	\$38.50	\$76,230	026-660-1000	98 Site p. 82
Install 10" diameter black steel pipe	1,100	LF	\$42.00	\$46,200	026-660-1010	98 Site p. 82
Install 12" diameter black steel pipe	220	LF	\$28.50	\$6,270	026-660-1020	98 Site p. 82
Total					\$180,675	
Repair roadway						
Install and compact 6" crushed stone base material	1,467	SY	\$0.20	\$293	022-226-5020	98 Site p. 44
Install 3" binder course	1,467	SY	\$5.30	\$7,773	025-104-0160	98 Site p. 67
Install 3" wearing course	1,467	SY	\$6.20	\$9,093	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	1,467	CY	\$0.47	\$689	022-226-5020	96 Site & Work
Total					\$17,849	
SUBTOTAL				\$198,524		
City cost index	85.60%					
TOTAL				\$169,937		
TOTAL with contingency of:	10%		\$16,994	\$186,931		
TOTAL with contingency of:	30%		\$50,981	\$220,918		
ROUNDED TO				\$187,000		
ROUNDED TO				\$221,000		

Table C.62. "Apples to Apples" estimates — Phase 5: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	2,420	LF	\$13.80	\$33,396	A12.3-110-1440	98 Site p. 372
Install 12" pipe bedding	1,650	LF	\$2.03	\$3,350	A12.3-310-1500	98 Site p. 375
Install 16" pipe bedding	770	LF	\$3.43	\$2,641	A12.3-310-1560	98 Site p. 375
Install 18" pipe bedding	0	LF	\$3.50	\$0	A12.3-310-1580	98 Site p. 375
Install 12" diameter black steel pipe	1,650	LF	\$28.50	\$47,025	026-660-1020	98 Site p. 82
Install 16" diameter black steel pipe	770	LF	\$35.00	\$26,950	estimated	
Install 18" diameter black steel pipe	0	LF	\$37.00	\$0	026-660-1030	98 Site p. 82
Total					\$113,362	
Repair roadway						
Install and compact 6" crushed stone base material	1,076	SY	\$0.20	\$215	022-226-5020	98 Site p. 44
Install 3" binder course	1,076	SY	\$5.30	\$5,700	025-104-0160	98 Site p. 67
Install 3" wearing course	1,076	SY	\$6.20	\$6,668	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	1,076	CY	\$0.47	\$506	022-226-5020	96 Site & Work
Total					\$13,090	
SUBTOTAL				\$126,451		
City cost index	85.60%					
TOTAL				\$108,242		
TOTAL with contingency of:	10%		\$10,824	\$119,066		
TOTAL with contingency of:	30%		\$32,473	\$140,715		
ROUNDED TO				\$119,000		
ROUNDED TO				\$141,000		

Table C.63. "CERL Scenario" estimates — Phase 5: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	1,760	LF	\$13.80	\$24,288	A12.3-110-1440	98 Site p. 372
Install 8" pipe bedding	1,320	LF	\$1.93	\$2,548	A12.3-310-1460	98 Site p. 375
Install 10" pipe bedding	440	LF	\$1.97	\$867	A12.3-310-1480	98 Site p. 375
Install 12" pipe bedding	0	LF	\$2.03	\$0	A12.3-310-1500	98 Site p. 375
Install 8" diameter black steel pipe	1,320	LF	\$38.50	\$50,820	026-660-1000	98 Site p. 82
Install 10" diameter black steel pipe	440	LF	\$42.00	\$18,480	026-660-1010	98 Site p. 82
Install 12" diameter black steel pipe	0	LF	\$28.50	\$0	026-660-1020	98 Site p. 82
Total					\$97,002	
Repair roadway						
Install and compact 6" crushed stone base material	782	SY	\$0.20	\$156	022-226-5020	98 Site p. 44
Install 3" binder course	782	SY	\$5.30	\$4,146	025-104-0160	98 Site p. 67
Install 3" wearing course	782	SY	\$6.20	\$4,850	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	782	CY	\$0.47	\$368	022-226-5020	96 Site & Work
Total					\$9,520	
SUBTOTAL				\$106,522		
City cost index	85.60%					
TOTAL				\$91,183		
TOTAL with contingency of:	10%		\$9,118	\$100,301		
TOTAL with contingency of:	30%		\$27,355	\$118,538		
ROUNDED TO				\$100,000		
ROUNDED TO				\$119,000		

Table C.64. "Apples to Apples" estimates — Phase 6: Install new domestic water lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	4,785	LF	\$13.80	\$66,033	A12.3-110-1440	98 Site p. 372
Install 12" pipe bedding	2,475	LF	\$2.03	\$5,024	A12.3-310-1500	98 Site p. 375
Install 16" pipe bedding	1,595	LF	\$3.43	\$5,471	A12.3-310-1560	98 Site p. 375
Install 18" pipe bedding	715	LF	\$3.50	\$2,503	A12.3-310-1580	98 Site p. 375
Install 12" diameter black steel pipe	2,475	LF	\$28.50	\$70,538	026-660-1020	98 Site p. 82
Install 16" diameter black steel pipe	1,595	LF	\$35.00	\$55,825	estimated	
Install 18" diameter black steel pipe	715	LF	\$37.00	\$26,455	026-660-1030	98 Site p. 82
Total					\$231,848	
Repair roadway						
Install and compact 6" crushed stone base material	2,127	SY	\$0.20	\$425	022-226-5020	98 Site p. 44
Install 3" binder course	2,127	SY	\$5.30	\$11,271	025-104-0160	98 Site p. 67
Install 3" wearing course	2,127	SY	\$6.20	\$13,185	025-104-0460	98 Site p. 68
Compaction of 6" asphalt surface	2,127	CY	\$0.47	\$1,000	022-226-5020	96 Site & Work
Total					\$25,882	
SUBTOTAL				\$257,730		
City cost index	85.60%					
TOTAL				\$220,617		
TOTAL with contingency of:	10%		\$22,062	\$242,678		
TOTAL with contingency of:	30%		\$66,185	\$286,802		
ROUNDED TO				\$243,000		
ROUNDED TO				\$287,000		

Table C.65. "Apples to Apples" estimates — Phase 1: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove existing hydrants	75	EA	\$420.00	\$31,500	020-554-0900	98 Site p. 27
Rubbish handling	26	CY	\$14.40	\$377	020-620-3080	98 Heavy p. 31
Haul debris to dump	26	CY	\$6.40	\$168	020-620-5000	98 Heavy p. 31
Disposal fee for debris	26	CY	\$6.00	\$157		BFI
Total					\$32,202	
Install fire hydrants						
Install new hydrants	75	EA	\$3,810.00	\$285,750	A12.3-922-1300	98 Site p. 382
Total					\$285,750	
SUBTOTAL				\$317,952		
City cost index	85.60%					
TOTAL				\$272,167		
TOTAL with contingency of:	10%		\$27,217	\$299,383		
TOTAL with contingency of:	30%		\$81,650	\$353,817		
ROUNDED TO				\$299,000		
ROUNDED TO				\$354,000		

Table C.66. "CERL Scenario" estimates — Phase 1: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove existing hydrants	15	EA	\$420.00	\$6,300	020-554-0900	98 Site p. 27
Rubbish handling	5	CY	\$14.40	\$75	020-620-3080	98 Heavy p. 31
Haul debris to dump	5	CY	\$6.40	\$34	020-620-5000	98 Heavy p. 31
Disposal fee for debris	5	CY	\$6.00	\$31		BFI
Total					\$6,440	
Install fire hydrants						
Install new hydrants	15	EA	\$3,810.00	\$57,150	A12.3-922-1300	98 Site p. 382
Total					\$57,150	
SUBTOTAL				\$63,590		
City cost index	85.60%					
TOTAL				\$54,433		
TOTAL with contingency of:	10%		\$5,443	\$59,877		
TOTAL with contingency of:	30%		\$16,330	\$70,763		
ROUNDED TO				\$60,000		
ROUNDED TO				\$71,000		

Table C.67. "Apples to Apples" estimates — Phase 2: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove existing hydrants	40	EA	\$420.00	\$16,800	020-554-0900	98 Site p. 27
Rubbish handling	14	CY	\$14.40	\$201	020-620-3080	98 Heavy p. 31
Haul debris to dump	14	CY	\$6.40	\$89	020-620-5000	98 Heavy p. 31
Disposal fee for debris	14	CY	\$6.00	\$84		BFI
Total					\$17,174	
Install fire hydrants						
Install new hydrants	40	EA	\$3,810.00	\$152,400	A12.3-922-1300	98 Site p. 382
Total					\$152,400	
SUBTOTAL				\$169,574		
City cost index	85.60%					
TOTAL				\$145,156		
TOTAL with contingency of:	10%		\$14,516	\$159,671		
TOTAL with contingency of:	30%		\$43,547	\$188,702		
ROUNDED TO				\$160,000		
ROUNDED TO				\$189,000		

Table C.68. "CERL Scenario" estimates — Phase 2: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove existing hydrants	16	EA	\$420.00	\$6,720	020-554-0900	98 Site p. 27
Rubbish handling	6	CY	\$14.40	\$80	020-620-3080	98 Heavy p. 31
Haul debris to dump	6	CY	\$6.40	\$36	020-620-5000	98 Heavy p. 31
Disposal fee for debris	6	CY	\$6.00	\$34		BFI
Total					\$6,870	
Install fire hydrants						
Install new hydrants	16	EA	\$3,810.00	\$60,960	A12.3-922-1300	98 Site p. 382
Total					\$60,960	
SUBTOTAL				\$67,830		
City cost index	85.60%					
TOTAL				\$58,062		
TOTAL with contingency of:	10%		\$5,806	\$63,868		
TOTAL with contingency of:	30%		\$17,419	\$75,481		
ROUNDED TO				\$64,000		
ROUNDED TO				\$75,000		

Table C.69. "Apples to Apples" estimates — Phase 3: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove existing hydrants	50	EA	\$420.00	\$21,000	020-554-0900	98 Site p. 27
Rubbish handling	17	CY	\$14.40	\$251	020-620-3080	98 Heavy p. 31
Haul debris to dump	17	CY	\$6.40	\$112	020-620-5000	98 Heavy p. 31
Disposal fee for debris	17	CY	\$6.00	\$105		BFI
Total					\$21,468	
Install fire hydrants						
Install new hydrants	50	EA	\$3,810.00	\$190,500	A12.3-922-1300	98 Site p. 382
Total					\$190,500	
SUBTOTAL				\$211,968		
City cost index	85.60%					
TOTAL				\$181,444		
TOTAL with contingency of:	10%		\$18,144	\$199,589		
TOTAL with contingency of:	30%		\$54,433	\$235,878		
ROUNDED TO				\$200,000		
ROUNDED TO				\$236,000		

Table C.70. "CERL Scenario" estimates — Phase 3: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Demolition</i>						
Remove existing hydrants	10	EA	\$420.00	\$4,200	020-554-0900	98 Site p. 27
Rubbish handling	3	CY	\$14.40	\$50	020-620-3080	98 Heavy p. 31
Haul debris to dump	3	CY	\$6.40	\$22	020-620-5000	98 Heavy p. 31
Disposal fee for debris	3	CY	\$6.00	\$21		BFI
Total					\$4,294	
<i>Install fire hydrants</i>						
Install new hydrants	10	EA	\$3,810.00	\$38,100	A12.3-922-1300	98 Site p. 382
Total					\$38,100	
SUBTOTAL				\$42,394		
City cost index	85.60%					
TOTAL				\$36,289		
TOTAL with contingency of:	10%		\$3,629	\$39,918		
TOTAL with contingency of:	30%		\$10,887	\$47,176		
<i>ROUNDED TO</i>				\$40,000		
<i>ROUNDED TO</i>				\$47,000		

Table C.71. "Apples to Apples" estimates — Phase 5: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Demolition</i>						
Remove existing hydrants	40	EA	\$420.00	\$16,800	020-554-0900	98 Site p. 27
Rubbish handling	14	CY	\$14.40	\$201	020-620-3080	98 Heavy p. 31
Haul debris to dump	14	CY	\$6.40	\$89	020-620-5000	98 Heavy p. 31
Disposal fee for debris	14	CY	\$6.00	\$84		BFI
Total					\$17,174	
<i>Install fire hydrants</i>						
Install new hydrants	40	EA	\$3,810.00	\$152,400	A12.3-922-1300	98 Site p. 382
Total					\$152,400	
SUBTOTAL				\$169,574		
City cost index	85.60%					
TOTAL				\$145,156		
TOTAL with contingency of:	10%		\$14,516	\$159,671		
TOTAL with contingency of:	30%		\$43,547	\$188,702		
<i>ROUNDED TO</i>				\$160,000		
<i>ROUNDED TO</i>				\$189,000		

Table C.72. "CERL Scenario" estimates — Phase 5: Remove and replace fire hydrants.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove existing hydrants	20	EA	\$420.00	\$8,400	020-554-0900	98 Site p. 27
Rubbish handling	7	CY	\$14.40	\$101	020-620-3080	98 Heavy p. 31
Haul debris to dump	7	CY	\$6.40	\$45	020-620-5000	98 Heavy p. 31
Disposal fee for debris	7	CY	\$6.00	\$42		BFI
Total					\$8,587	
Install fire hydrants						
Install new hydrants	20	EA	\$3,810.00	\$76,200	A12.3-922-1300	98 Site p. 382
Total					\$76,200	
SUBTOTAL				\$84,787		
City cost index	85.60%					
TOTAL				\$72,578		
TOTAL with contingency of:	10%		\$7,258	\$79,836		
TOTAL with contingency of:	30%		\$21,773	\$94,351		
ROUNDED TO				\$80,000		
ROUNDED TO				\$94,000		

Table C.73. "Apples to Apples" and "CERL Scenario" estimates — Phase 1: Connect system to remaining buildings/install meters.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install water meters						
Install water meters	35	EA	\$775.00	\$27,125	153-160-2360	98 Site p. 296
Total					\$27,125	
Install water connection						
Install water connection	35	EA	\$980.00	\$34,300	A12.3-925-2080	98 Site p. 384
Total					\$34,300	
Install Pipe						
Excavate/backfill trench	1,925	LF	\$13.80	\$26,565	A12.3-110-1440	98 Site p. 372
Install pipe bedding	1,925	LF	\$0.87	\$1,675	A12.3-310-1440	98 Site p. 375
Install 2" diameter pipe	1,750	LF	\$3.80	\$6,650	026-674-1160	98 Site p. 84
Total					\$34,890	
SUBTOTAL				\$96,315		
City cost index	85.6%					
TOTAL				\$82,445		
TOTAL with contingency of:	10%		\$8,245	\$90,690		
TOTAL with contingency of:	30%		\$24,734	\$107,179		
ROUNDED TO				\$91,000		
ROUNDED TO				\$107,000		

Table C.74. "Apples to Apples" and "CERL Scenario" estimates — Phases 2, 3, and 5: Connect system to remaining buildings/install meters.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install water meters						
Install water meters	10	EA	\$775.00	\$7,750	153-160-2360	98 Site p. 296
Total					\$7,750	
Install water connection						
Install water connection	10	EA	\$980.00	\$9,800	A12.3-925-2080	98 Site p. 384
Total					\$9,800	
Install Pipe						
Excavate/backfill trench	550	LF	\$13.80	\$7,590	A12.3-110-1440	98 Site p. 372
Install pipe bedding	550	LF	\$0.87	\$479	A12.3-310-1440	98 Site p. 375
Install 2" diameter pipe	500	LF	\$3.80	\$1,900	026-674-1160	98 Site p. 84
Total					\$9,969	
SUBTOTAL				\$27,519		
City cost index	85.6%					
TOTAL				\$23,556		
TOTAL with contingency of:	10%		\$2,356	\$25,911		
TOTAL with contingency of:	30%		\$7,067	\$30,623		
ROUNDED TO				\$26,000		
ROUNDED TO				\$31,000		

Table C.75. Upgrade Boulevard from Gate 1 to new 10th Street extension.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
existing road removal						
Demolition						
Remove top soil	1,489	CY	\$0.93	\$1,385	029-204-1400	98 Site p. 116
Remove existing road	13,400	SY	\$6.10	\$81,740	020-554-1750	98 Site p. 28
Rubbish handling	4,467	CY	\$14.40	\$64,320	020-620-3080	98 Site p. 29
Haul debris to dump	4,467	CY	\$12.80	\$57,173	020-620-5000	98 Site p. 29
Disposal fee for debris	4,467	CY	\$6.00	\$26,800		
Total					\$231,418	
Remove existing sidewalk and curb and gutter						
Remove curb and gutter	8,040	LF	\$3.91	\$31,436	020-554-2500	98 Site p. 28
Remove sidewalk	0	SY	\$7.15	\$0	020-254-4200	98 Site p. 28
Rubbish handling	531	CY	\$14.40	\$7,641	020-620-3080	98 Site p. 29
Haul debris to dump	531	CY	\$12.80	\$6,792	020-620-5000	98 Site p. 29
Disposal fee for debris	531	CY	\$6.00	\$3,184		
Total					\$49,054	
new road construction						
Install new road						
Cut soil for new road	3,071	CY	\$1.64	\$5,037	022-242-2000	96 Site & Work
Grade soil	13,400	SY	\$0.72	\$9,648	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	13,400	SY	\$14.50	\$194,300	022-308-0200	98 Site p. 53
Install 3" binder course	21,440	SY	\$5.30	\$113,632	025-104-0160	98 Site p. 67
Install 1" wearing course	21,440	SY	\$2.23	\$47,811	025-104-0300	98 Site p. 68
Compaction of asphalt surface	2,382	CY	\$0.47	\$1,120	025-226-5020	
Total					\$371,547	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Paint markings						
Layout of crosswalk	7	LF	\$0.04	\$0.3	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	1,750	LF	\$1.17	\$2,048	025-804-0730	97 Site
Layout of directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Paint directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Layout of pavement marking	20,100	LF	\$0.04	\$804	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	20,100	LF	\$0.80	\$16,080	025-804-0710	98 Site p. 75
Total					\$18,932	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	1,167	CY	\$4.97	\$5,802	022-254-0500	97 Site
Install curb and gutter	16,080	LF	\$8.90	\$143,112	025-025-0448	97 Site
Install catch basins	161	EA	\$1,535.00	\$247,135	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	17,688	LF	\$5.30	\$93,746	027-108-3020	97 Site p. 87
Total					\$489,795	
Install sidewalks						
Install sidewalk	16,080	LF	\$10.50	\$168,840	A12.7-140-1580	97 Assemblies p. 421
Total					\$168,840	
Install trees and sod next to sidewalk and in median						
Hauling of fill	1,787	CY	\$23.00	\$41,093	022-266-0560	97 Site p. 46
Spread fill material	1,787	CY	\$1.40	\$2,501	022-262-0010	97 Site p. 46
Install sod	145	MSF	\$505.00	\$73,225	029-316-0300	97 Site p. 116
Install trees and pit	402	EA	\$100.07	\$40,228	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$157,048	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
Install street lights						
Install street lights 400 watt	20	EA	\$2,085.00	\$41,700	A12.7-500-2330	
Total					\$41,700	
adjustments				-\$203,072		
SUBTOTAL				\$1,329,586		
City cost index	85.9%					
TOTAL				\$1,142,115		
TOTAL with contingency of:	10%			\$1,256,326		
TOTAL with contingency of:	30%			\$1,484,749		
ROUNDED TO				\$1,256,000		
ROUNDED TO				\$1,485,000		
	\$990,000	\$1,045,000	\$1,236,000	\$953,000	\$1,125,000	
Upgrade Boulevard (G Street), 1st Street South of G Street						

Table C.76. Upgrade 1st from G to K St.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
existing road removal						
<i>Demolition</i>						
Remove top soil	191	CY	\$0.93	\$178	029-204-1400	98 Site p. 116
Remove existing road	1,718	SY	\$6.10	\$10,478	020-554-1750	98 Site p. 28
Rubbish handling	573	CY	\$14.40	\$8,245	020-620-3080	98 Site p. 29
Haul debris to dump	573	CY	\$12.80	\$7,329	020-620-5000	98 Site p. 29
Disposal fee for debris	573	CY	\$6.00	\$3,436		
Total					\$29,666	
<i>Remove existing sidewalk and curb and gutter</i>						
Remove curb and gutter	1,546	LF	\$3.91	\$6,045	020-554-2500	98 Site p. 28
Remove sidewalk	0	SY	\$7.15	\$0	020-254-4200	98 Site p. 28
Rubbish handling	102	CY	\$14.40	\$1,469	020-620-3080	98 Site p. 29
Haul debris to dump	102	CY	\$12.80	\$1,306	020-620-5000	98 Site p. 29
Disposal fee for debris	102	CY	\$6.00	\$612		
Total					\$9,432	
new road construction						
<i>Install new road</i>						
Cut soil for new road	2,037	CY	\$1.64	\$3,340	022-242-2000	96 Site & Work
Grade soil	1,718	SY	\$0.72	\$1,237	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	1,718	SY	\$14.50	\$24,908	022-308-0200	98 Site p. 53
Install 3" binder course	4,123	SY	\$5.30	\$21,850	025-104-0160	98 Site p. 67
Install 1" wearing course	4,123	SY	\$2.23	\$9,194	025-104-0300	98 Site p. 68
Compaction of asphalt surface	458	CY	\$0.47	\$215	025-226-5020	
Total					\$60,744	
<i>Paint markings</i>						
Layout of crosswalk	3	LF	\$0.04	\$0	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	750	LF	\$1.17	\$878	025-804-0730	97 Site
Layout of directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Paint directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Layout of pavement marking	3,865	LF	\$0.04	\$155	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	3,865	LF	\$0.80	\$3,092	025-804-0710	98 Site p. 75
Total					\$4,124	
<i>Install new curb & gutter plus catch basin</i>						
Excavate for curb and gutter	112	CY	\$4.97	\$558	022-254-0500	97 Site
Install curb and gutter	1,546	LF	\$8.90	\$13,759	025-025-0448	97 Site
Install catch basins	15	EA	\$1,535.00	\$23,025	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	1,701	LF	\$5.30	\$9,013	027-108-3020	97 Site p. 87
Total					\$46,355	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install sidewalks						
Install sidewalk	1,546	LF	\$10.50	\$16,233	A12.7-140-1580	97 Assemblies p. 421
Total					\$16,233	
Install trees and sod next to sidewalk and in median						
Hauling of fill	76	CY	\$23.00	\$1,756	022-266-0560	97 Site p. 46
Spread fill material	76	CY	\$1.40	\$107	022-262-0010	97 Site p. 46
Install sod	6	MSF	\$505.00	\$3,030	029-316-0300	97 Site p. 116
Install trees and pit	13	EA	\$100.07	\$1,301	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$6,194	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
Install street lights						
Remove and reinstall existing poles & lights	4	EA	\$532.00	\$2,128	CERL estimate	
Total					\$2,128	
adjustments				-\$12,646		
SUBTOTAL				\$166,555		
City cost index	85.9%					
TOTAL				\$143,071		
TOTAL with contingency of:	10%			\$157,378		
TOTAL with contingency of:	30%			\$185,992		
ROUNDED TO				\$157,000		
ROUNDED TO				\$186,000		

Table C.77. Construct new road from G Street to 10th.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	1,560	CY	\$1.64	\$2,558	022-242-2000	96 Site & Work
Grade soil	4,680	SY	\$0.72	\$3,370	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	4,680	SY	\$14.50	\$67,860	022-308-0200	98 Site p. 53
Install 3" binder course	4,160	SY	\$5.30	\$22,048	025-104-0160	98 Site p. 67
Install 1" wearing course	4,160	SY	\$2.23	\$9,277	025-104-0300	98 Site p. 68
Compaction of asphalt surface	462	CY	\$0.47	\$217	025-226-5020	
Total					\$105,330	
Paint markings						
Layout of crosswalk	2	LF	\$0.04	\$0	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Paint directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Layout of pavement marking	3,900	LF	\$0.04	\$156	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	3,900	LF	\$0.80	\$3,120	025-804-0710	98 Site p. 75
Total					\$3,861	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	227	CY	\$4.97	\$1,126	022-254-0500	97 Site
Install curb and gutter	3,120	LF	\$8.90	\$27,768	025-025-0448	97 Site
Install catch basins	31	EA	\$1,535.00	\$47,585	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	3,432	LF	\$5.30	\$18,190	027-108-3020	97 Site p. 87
Total					\$94,668	
Install sidewalks						
Remove existing soil	1,040	SY	\$6.70	\$6,968	020-554-1750	97 Site p. 28
Grade soil	1,040	SY	\$0.72	\$749	0225-122-1020	97 Site p. 63
Install sidewalk	1,560	LF	\$13.20	\$20,592	A12.7-140-1580	97 Assemblies p. 421
Total					\$28,309	
Install trees and sod next to sidewalk						
Hauling of fill	116	CY	\$23.00	\$2,658	022-266-0560	97 Site p. 46
Spread fill material	116	CY	\$1.40	\$162	022-262-0010	97 Site p. 46
Install sod	9	MSF	\$505.00	\$4,545	029-316-0300	97 Site p. 116
Install trees and pit	39	EA	\$100.07	\$3,903	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$11,267	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	4	EA	\$2,085.00	\$8,340	A12.7-500-2330	
Total					\$8,340	
adjustment				-\$21,769		
SUBTOTAL				\$232,168		
City cost index	85.9%					
TOTAL				\$199,433		
TOTAL with contingency of:	10%			\$219,376		
TOTAL with contingency of:	30%			\$259,262		
ROUNDED TO				\$259,000		
ROUNDED TO				\$259,000		

Table C.78. Construct new road 10th to South Gate.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	3,751	CY	\$1.64	\$6,152	022-242-2000	96 Site & Work
Grade soil	11,253	SY	\$0.72	\$8,102	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	11,253	SY	\$14.50	\$163,173	022-308-0200	98 Site p. 53
Install 3" binder course	11,253	SY	\$5.30	\$59,643	025-104-0160	98 Site p. 67
Install 1" wearing course	11,253	SY	\$2.23	\$25,095	025-104-0300	98 Site p. 68
Compaction of asphalt surface	1,250	CY	\$0.47	\$588	025-226-5020	
Total					\$262,753	
Paint markings						
Layout of crosswalk	2	LF	\$0.04	\$0	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Paint directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Layout of pavement marking	10,550	LF	\$0.04	\$422	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	10,550	LF	\$0.80	\$8,440	025-804-0710	98 Site p. 75
Total					\$9,447	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	306	CY	\$4.97	\$1,523	022-254-0500	97 Site
Install curb and gutter	4,220	LF	\$8.90	\$37,558	025-025-0448	97 Site
Install catch basins	42	EA	\$1,535.00	\$64,470	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	4,642	LF	\$5.30	\$24,603	027-108-3020	97 Site p. 87
Total					\$128,153	
Install sidewalks						
Install sidewalk	4,220	LF	\$10.50	\$44,310	A12.7-140-1580	97 Assemblies p. 421
Total					\$44,310	
Install trees and sod next to sidewalk						
Hauling of fill	208	CY	\$23.00	\$4,793	022-266-0560	97 Site p. 46
Spread fill material	208	CY	\$1.40	\$292	022-262-0010	97 Site p. 46
Install sod	17	MSF	\$505.00	\$8,585	029-316-0300	97 Site p. 116
Install trees and pit	70	EA	\$100.07	\$7,005	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$20,675	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	11	EA	\$2,085.00	\$22,935	A12.7-500-2330	
Total					\$22,935	
adjustment				-\$45,772		
SUBTOTAL				\$444,663		
City cost index	85.9%					
TOTAL				\$381,966		
TOTAL with contingency of:	10%			\$420,162		
TOTAL with contingency of:	30%			\$496,555		
ROUNDED TO				\$420,000		
ROUNDED TO				\$497,000		

Table C.79. Construction of Western parking lot on G Street.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Install new parking lot</i>						
Cut soil for new parking lot	7,497	CY	\$1.64	\$12,295	022-242-2000	96 Site & Work
Grade soil	29,987	SY	\$0.72	\$21,591	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	29,987	SY	\$9.75	\$292,372	022-308-0100	98 Site p. 53
Install 3" binder course	29,987	SY	\$5.30	\$158,931	025-104-0160	98 Site p. 67
Install 1" wearing course	29,987	SY	\$2.23	\$66,871	025-104-0300	98 Site p. 68
Compaction of asphalt surface	2,499	CY	\$0.47	\$1,174	025-226-5020	
Total					\$553,233	
Total					\$0	
<i>Install Catch Basins</i>						
Excavate for pipe connecting catch basins	1,700	CY	\$4.97	\$8,449	022-254-0500	97 Site
Install catch basins	13	EA	\$1,535.00	\$19,564	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	2,805	LF	\$5.30	\$14,867	027-108-3020	97 Site p. 87
Total					\$42,879	
<i>Install trees, seed new grass</i>						
Lawns & Ground Cover	10	MSF	\$454.50	\$4,545	A12.7-411-1080	98 Site
Install trees and pit	41	EA	\$50.59	\$2,074	A12.7-421-1220	98 Site
Total					\$6,619	
<i>Install reflective street signs</i>						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
<i>Install street lamps</i>						
Install street lights 400 watt	13	EA	\$2,085.00	\$27,105	A12.7-500-2330	98 Site p. 409
Total					\$27,105	
<i>Disposal fee for debris</i>						
Rubbish handling	9,388	CY	\$13.30	\$124,858	020-620-3080	97 Site
Haul debris to dump	9,388	CY	\$6.30	\$59,143	020-620-5000	97 Site p. 29
Disposal fee for debris	9,388	CY	\$6.00	\$56,327	020-612-0320	97 Site
Total					\$240,327	
adjustment				-\$35,964		
SUBTOTAL				\$836,440		
City cost index	85.9%					
TOTAL				\$718,502		
TOTAL with contingency of:	10%			\$790,352		
TOTAL with contingency of:	30%			\$934,052		
<i>ROUNDED TO</i>				\$790,000		
<i>ROUNDED TO</i>				\$934,000		

Table C.80. Construction of Eastern parking lot on G Street.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new parking lot						
Cut soil for new parking lot	8,268	CY	\$1.64	\$13,560	022-242-2000	96 Site & Work
Grade soil	33,073	SY	\$0.72	\$23,812	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	33,073	SY	\$9.75	\$322,459	022-308-0100	98 Site p. 53
Install 3" binder course	33,073	SY	\$5.30	\$175,285	025-104-0160	98 Site p. 67
Install 1" wearing course	33,073	SY	\$2.23	\$73,752	025-104-0300	98 Site p. 68
Compaction of asphalt surface	2,756	CY	\$0.47	\$1,295	025-226-5020	
Total					\$610,163	
Paint markings						
Layout of pavement marking	19,507	LF	\$0.04	\$780	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	19,507	LF	\$0.80	\$15,605	025-804-0710	98 Site p. 75
Total					\$16,386	
Install Catch Basins						
Excavate for pipe connecting catch basins	1,833	CY	\$4.97	\$9,112	022-254-0500	97 Site
Install catch basins	15	EA	\$1,535.00	\$23,377	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	3,025	LF	\$5.30	\$16,033	027-108-3020	97 Site p. 87
Total					\$48,521	
Install trees and sod next to sidewalk						
Lawn & Ground Cover	11	MSF	\$454.50	\$454.50	A12.7-411-1080	98 Site
Install trees and pit	60	EA	\$50.59	\$3,035	A12.7-421-1220	98 Site
Total					\$3,490	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
Install street lamps						
Install street lights 400 watt	14	EA	\$2,085.00	\$29,190	A12.7-500-2330	98 Site p. 409
Total					\$29,190	
Disposal fee for debris						
Rubbish handling	10,306	CY	\$13.30	\$137,074	020-620-3080	97 Site
Haul debris to dump	10,306	CY	\$6.30	\$64,930	020-620-5000	97 Site p. 29
Disposal fee for debris	10,306	CY	\$6.00	\$61,838	020-612-0320	97 Site
Total					\$263,842	
adjustment				-34,920		
SUBTOTAL				\$938,912		
City cost index	85.9%					
TOTAL				\$806,525		
TOTAL with contingency of:	10%			\$887,178		
TOTAL with contingency of:	30%			\$1,048,483		
ROUNDED TO				\$887,000		
ROUNDED TO				\$1,048,000		

Table C.81. Upgrade lot on North side of Bldg 144.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove damaged curb and gutter	102	LF	\$3.28	\$335	020-554-2400	97 Site p. 28
Rubbish handling	7	CY	\$13.30	\$90	020-620-3080	97 Site
Haul debris to dump	7	CY	\$6.30	\$42	020-620-5000	97 Site p. 29
Disposal fee for debris	7	CY	\$6.00	\$40	020-612-0320	97 Site p. 29
Total					\$507	
Chip seal existing parking lots						
Sweep and remove debris	258	MSF	\$2.15	\$555	029-710-6420	97 Site p. 119
Repair potholes & damages	1,433	SY	\$12.90	\$18,489	029-710-5913	97 Site p. 119
Install chip seal	28,665	SY	\$3.39	\$97,174	025-458-2350	97 Site p. 68
Total					\$116,217	
Finish and landscaping						
Layout of parking stalls	34,400	LF	\$0.04	\$1,376	025-804-0790	97 Site p.70
Paint parking stalls (Thermoplastic paint)	860	EA	\$4.39	\$3,775	025-804-0800	97 Site p. 70
Paint parking stalls-handicap stalls	17	EA	\$80.50	\$1,369	025-804-1200	97 Site p. 70
Lawn & Ground Cover	2	MSF	\$454.50	\$454.50	A12.7-411-1080	98 Site
Install trees and pit	34	EA	\$50.59	\$1,720	A12.7-421-1220	98 Site
Install site lighting	0	EA	\$2,255.00	\$0	A12.7-500-3120	97 Site p. 397
Total					\$8,694	
adjustment				-\$2,175		
SUBTOTAL				\$123,244		
City cost index	86%					
TOTAL				\$105,867		
TOTAL with contingency of:	10%			\$116,454		
TOTAL with contingency of:	30%			\$137,627		
ROUNDED TO				\$116,000		
ROUNDED TO				\$138,000		

Table C.82. Upgrade lot on East and South side of Bldg 144.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Chip seal existing parking lots						
Sweep and remove debris	32	MSF	\$2.15	\$70	029-710-6420	97 Site p. 119
Repair potholes & damages (10% of existing)	180	SY	\$12.90	\$2,328	029-710-5913	97 Site p. 119
Install chip seal	3,610	SY	\$3.39	\$12,237	025-458-2350	97 Site p. 68
Finish and landscaping						
Layout of parking stalls	2,520	LF	\$0.04	\$101	025-804-0790	97 Site p.70
Paint parking stalls (Thermoplastic paint)	63	EA	\$4.39	\$277	025-804-0800	97 Site p. 70
Paint parking stalls-handicap stalls	1	EA	\$80.50	\$81	025-804-1200	97 Site p. 70
SUBTOTAL				\$15,093		
City cost index	86%					
TOTAL				\$12,965		
TOTAL with contingency of:	10%			\$14,262		
TOTAL with contingency of:	30%			\$16,855		
ROUNDED TO				\$14,000		
ROUNDED TO				\$17,000		

Table C.83. Widen 4th to 4 lane and extend.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Remove soil for widening existing road.						
Remove top soil	178	CY	\$0.93	\$165	029-204-1400	98 Site p. 116
Rubbish handling	178	CY	\$14.40	\$2,560	020-620-3080	98 Site p. 29
Haul debris to dump	178	CY	\$12.80	\$2,276	020-620-5000	98 Site p. 29
Disposal fee for debris	178	CY	\$6.00	\$1,067		
Total					\$6,068	
new road construction						
Install new road						
Cut soil for new road	178	CY	\$1.64	\$292	022-242-2000	96 Site & Work
Grade soil	533	SY	\$0.72	\$384	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	533	SY	\$14.50	\$7,733	022-308-0200	98 Site p. 53
Install 3" binder course	533	SY	\$5.30	\$2,827	025-104-0160	98 Site p. 67
Install 1" wearing course	533	SY	\$2.23	\$1,189	025-104-0300	98 Site p. 68
Compaction of asphalt surface	84	CY	\$0.47	\$39	025-226-5020	
Total					\$12,464	
Paint markings						
Layout of crosswalk	8	LF	\$0.04	\$0.32	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	2,000	LF	\$1.17	\$2,340	025-804-0730	97 Site
Layout of directional arrows	400	SF	\$4.61	\$1,844	025-804-0760	97 Site
Paint directional arrows	400	SF	\$4.61	\$1,844	025-804-0760	97 Site
Layout of pavement marking	6,800	LF	\$0.04	\$272	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	6,800	LF	\$0.80	\$5,440	025-804-0710	98 Site p. 75
Total					\$11,740	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	247	CY	\$4.97	\$1,227	022-254-0500	97 Site
Install curb and gutter	3,400	LF	\$8.90	\$30,260	025-025-0448	97 Site
Install catch basins	34	EA	\$1,535.00	\$52,190	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	3,740	LF	\$5.30	\$19,822	027-108-3020	97 Site p. 87
Total					\$103,499	
Install sidewalks						
Install sidewalk	2,400	LF	\$10.50	\$25,200	A12.7-140-1580	97 Assemblies p. 421
Total					\$25,200	
Install trees and sod next to sidewalk						
Hauling of fill	252	CY	\$23.00	\$5,793	022-266-0560	97 Site p. 46
Spread fill material	252	CY	\$1.40	\$353	022-262-0010	97 Site p. 46
Install sod	20	MSF	\$505.00	\$10,100	029-316-0300	97 Site p. 116
Install trees and pit	57	EA	\$100.07	\$5,704	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$21,949	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install street lights						
Remove and reinstall existing poles & lights	9	EA	\$532.00	\$4,788	CERL estimate	
Total					\$4,788	
adjustment				-\$32,512		
SUBTOTAL				\$157,520		
City cost index	85.9%					
TOTAL				\$135,309		
TOTAL with contingency of:	10%			\$148,840		
TOTAL with contingency of:	30%			\$175,902		
ROUNDED TO				\$149,000		
ROUNDED TO				\$176,000		

Table C.84. Remove RR ballast and install 50-ft easement.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Existing road removal						
Demolition						
Remove top soil	1,301	CY	\$0.93	\$1,210	029-204-1400	98 Site p. 116
Remove existing road	7,026	SY	\$6.10	\$42,859	020-554-1750	98 Site p. 28
Rubbish handling	2,862	CY	\$14.40	\$41,219	020-620-3080	98 Site p. 29
Haul debris to dump	2,862	CY	\$12.80	\$36,639	020-620-5000	98 Site p. 29
Disposal fee for debris	2,862	CY	\$6.00	\$17,175		
Total					\$139,102	
New road construction						
Install new road						
Cut soil for new road	3,279	CY	\$1.64	\$5,377	022-242-2000	96 Site & Work
Grade soil	18,736	SY	\$0.72	\$13,490	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	18,736	SY	\$14.50	\$271,672	022-308-0200	98 Site p. 53
Install 3" binder course	18,736	SY	\$5.30	\$99,301	025-104-0160	98 Site p. 67
Install 1" wearing course	18,736	SY	\$2.23	\$41,781	025-104-0300	98 Site p. 68
Compaction of asphalt surface	2,082	CY	\$0.47	\$978	025-226-5020	
Total					\$432,600	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
adjustment				-\$5,775		
SUBTOTAL				\$570,250		
City cost index	85.9%					
TOTAL				\$489,845		
TOTAL with contingency of:	10%			\$538,829		
TOTAL with contingency of:	30%			\$636,798		
ROUNDED TO				\$539,000		
ROUNDED TO				\$637,000		

Table C.85. Construct new road between J Street and new 10th extension.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	533	CY	\$1.64	\$875	022-242-2000	96 Site & Work
Grade soil	1,600	SY	\$0.72	\$1,152	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	14,400	SY	\$14.50	\$208,800	022-308-0200	98 Site p. 53
Install 3" binder course	1,600	SY	\$5.30	\$8,480	025-104-0160	98 Site p. 67
Install 1" wearing course	1,600	SY	\$2.23	\$3,568	025-104-0300	98 Site p. 68
Compaction of asphalt surface	178	CY	\$0.47	\$84	025-226-5020	
Total					\$222,958	
Paint markings						
Layout of crosswalk	2	LF	\$0.04	\$0	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of directional arrows	50	SF	\$4.61	\$231	025-804-0760	97 Site
Paint directional arrows	50	SF	\$4.61	\$231	025-804-0760	97 Site
Layout of pavement marking	3,000	LF	\$0.04	\$120	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	3,000	LF	\$0.80	\$2,400	025-804-0710	98 Site p. 75
Total					\$3,566	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	87	CY	\$4.97	\$433	022-254-0500	97 Site
Install curb and gutter	1,200	LF	\$8.90	\$10,680	025-025-0448	97 Site
Install catch basins	12	EA	\$1,535.00	\$18,420	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	1,320	LF	\$5.30	\$6,996	027-108-3020	97 Site p. 87
Total					\$36,529	
Install sidewalks						
Install sidewalk	1,200	LF	\$10.50	\$12,600	A12.7-140-1580	97 Assemblies p. 421
Total					\$12,600	
Install trees and sod next to sidewalk						
Hauling of fill	59	CY	\$23.00	\$1,363	022-266-0560	97 Site p. 46
Spread fill material	59	CY	\$1.40	\$83	022-262-0010	97 Site p. 46
Install sod	5	MSF	\$505.00	\$2,525	029-316-0300	97 Site p. 116
Install trees and pit	20	EA	\$100.07	\$2,001	A12.7-421-0000/R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$5,972	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	3	EA	\$2,085.00	\$6,255	A12.7-500-2330	
Total					\$6,255	
adjustment				-\$14,389		
SUBTOTAL				\$275,653		
City cost index	85.9%					
TOTAL				\$236,786		
TOTAL with contingency of:	10%			\$260,465		
TOTAL with contingency of:	30%			\$307,822		
ROUNDED TO				\$260,000		
ROUNDED TO				\$308,000		

Table C.86. Construct new G Street road between 10th and new 23rd.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	2,612	CY	\$1.64	\$4,284	022-242-2000	96 Site & Work
Grade soil	7,836	SY	\$0.72	\$5,642	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	7,836	SY	\$14.50	\$113,622	022-308-0200	98 Site p. 53
Install 3" binder course	6,965	SY	\$5.30	\$36,916	025-104-0160	98 Site p. 67
Install 1" wearing course	6,965	SY	\$2.23	\$15,533	025-104-0300	98 Site p. 68
Compaction of asphalt surface	774	CY	\$0.47	\$364	025-226-5020	
Total					\$176,360	
Paint markings						
Layout of crosswalk	2	LF	\$0.04	\$0	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Paint directional arrows	0	SF	\$4.61	\$0	025-804-0760	97 Site
Layout of pavement marking	6,530	LF	\$0.04	\$261	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	6,530	LF	\$0.80	\$5,224	025-804-0710	98 Site p. 75
Total					\$6,070	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	379	CY	\$4.97	\$1,885	022-254-0500	97 Site
Install curb and gutter	5,224	LF	\$8.90	\$46,494	025-025-0448	97 Site
Install catch basins	52	EA	\$1,535.00	\$79,820	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	5,746	LF	\$5.30	\$30,456	027-108-3020	97 Site p. 87
Total					\$158,654	
Install sidewalks						
Install sidewalk	2,612	LF	\$10.50	\$27,426	A12.7-140-1580	97 Assemblies p. 421
Total					\$27,426	
Install trees and sod next to sidewalk						
Hauling of fill	193	CY	\$23.00	\$4,450	022-266-0560	97 Site p. 46
Spread fill material	193	CY	\$1.40	\$271	022-262-0010	97 Site p. 46
Install sod	16	MSF	\$505.00	\$8,080	029-316-0300	97 Site p. 116
Install trees and pit	65	EA	\$100.07	\$6,505	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$19,305	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	7	EA	\$2,085.00	\$14,595	A12.7-500-2330	
Total					\$14,595	
adjustment				-\$36,062		
SUBTOTAL				\$368,511		
City cost index	85.9%					
TOTAL				\$316,551		
TOTAL with contingency of:	10%			\$348,206		
TOTAL with contingency of:	30%			\$411,516		
ROUNDED TO				\$348,000		
ROUNDED TO				\$412,000		

Table C.87. Reconstruct 23rd Street from B to G.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Existing road removal						
<i>Demolition</i>						
Remove top soil	340	CY	\$0.93	\$316	029-204-1400	98 Site p. 116
Remove existing road	2,111	SY	\$6.10	\$12,878	020-554-1750	98 Site p. 28
Rubbish handling	809	CY	\$14.40	\$11,653	020-620-3080	98 Site p. 29
Haul debris to dump	809	CY	\$12.80	\$10,359	020-620-5000	98 Site p. 29
Disposal fee for debris	809	CY	\$6.00	\$4,856		
Total					\$40,062	
<i>Remove existing sidewalk and curb and gutter</i>						
Remove curb and gutter	0	LF	\$3.91	\$0	020-554-2500	98 Site p. 28
Remove sidewalk	0	SY	\$7.15	\$0	020-254-4200	98 Site p. 28
Rubbish handling	143	CY	\$14.40	\$2,057	020-620-3080	98 Site p. 29
Haul debris to dump	143	CY	\$12.80	\$1,828	020-620-5000	98 Site p. 29
Disposal fee for debris	143	CY	\$6.00	\$857		
Total					\$4,742	
New road construction						
<i>Install new road</i>						
Cut soil for new road	3,910	CY	\$1.64	\$6,413	022-242-2000	96 Site & Work
Grade soil	12,821	SY	\$0.72	\$9,231	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	12,821	SY	\$14.50	\$185,909	022-308-0200	98 Site p. 53
Install 3" binder course	12,821	SY	\$5.30	\$67,953	025-104-0160	98 Site p. 67
Install 1" wearing course	12,821	SY	\$2.23	\$28,592	025-104-0300	98 Site p. 68
Compaction of asphalt surface	1,425	CY	\$0.47	\$670	025-226-5020	
Total					\$298,768	
<i>Paint markings</i>						
Layout of crosswalk	4	LF	\$0.04	\$0	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	1,000	LF	\$1.17	\$1,170	025-804-0730	97 Site
Layout of directional arrows	400	SF	\$4.61	\$1,844	025-804-0760	97 Site
Paint directional arrows	400	SF	\$4.61	\$1,844	025-804-0760	97 Site
Layout of pavement marking	9,616	LF	\$0.04	\$385	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	9,616	LF	\$0.80	\$7,693	025-804-0710	98 Site p. 75
Total					\$12,936	
<i>Install new curb & gutter plus catch basin</i>						
Excavate for curb and gutter	349	CY	\$4.97	\$1,735	022-254-0500	97 Site
Install curb and gutter	4,808	LF	\$8.90	\$42,791	025-025-0448	97 Site
Install catch basins	48	EA	\$1,535.00	\$73,680	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	5,289	LF	\$5.30	\$28,031	027-108-3020	97 Site p. 87
Total					\$146,237	
<i>Install sidewalks</i>						
Install sidewalk	1,900	LF	\$10.50	\$19,950	A12.7-140-1580	97 Assemblies p. 421
Total					\$19,950	
<i>Install trees and sod next to sidewalk</i>						
Hauling of fill	141	CY	\$23.00	\$3,237	022-266-0560	97 Site p. 46
Spread fill material	141	CY	\$1.40	\$197	022-262-0010	97 Site p. 46
Install sod	11	MSF	\$505.00	\$5,555	029-316-0300	97 Site p. 116
Install trees and pit	32	EA	\$100.07	\$3,202	A12.7-421-0000/R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$12,191	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	
Install reflective street signs						
Install new signs	6	EA	\$97.00	\$582	104-304-4900	97 Site
Excavate for new posts	2	CY	\$4.48	\$9	022-254-0060	97 Site
Concrete for new posts	2	CY	\$520.00	\$1,089	033-130-1520	97 Site
Total					\$1,680	
Install street lights						
Install street lights 400 watt	12	EA	\$2,085.00	\$25,020	A12.7-500-2330	
Total					\$25,020	
adjustment				-\$40,975		
SUBTOTAL				\$522,693		
City cost index	85.9%					
TOTAL				\$448,994		
TOTAL with contingency of:	10%			\$493,893		
TOTAL with contingency of:	30%			\$583,692		
ROUNDED TO				\$494,000		
ROUNDED TO				\$584,000		

Table C.88. Reconstruct 10th Street from G Street to Gate 15.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
existing road removal						
Demolition						
Remove top soil	218	CY	\$0.93	\$203	029-204-1400	98 Site p. 116
Remove existing road	1,356	SY	\$6.10	\$8,269	020-554-1750	98 Site p. 28
Rubbish handling	520	CY	\$14.40	\$7,483	020-620-3080	98 Site p. 29
Haul debris to dump	520	CY	\$12.80	\$6,651	020-620-5000	98 Site p. 29
Disposal fee for debris	520	CY	\$6.00	\$3,118		
Total					\$25,724	
Remove existing sidewalk and curb and gutter						
Rubbish handling	92	CY	\$14.40	\$1,331	020-620-3080	98 Site p. 29
Haul debris to dump	92	CY	\$12.80	\$1,184	020-620-5000	98 Site p. 29
Disposal fee for debris	92	CY	\$6.00	\$555		
Total					\$3,070	
new road construction						
Install new road						
Cut soil for new road	3,571	CY	\$1.64	\$5,856	022-242-2000	96 Site & Work
Grade soil	11,413	SY	\$0.72	\$8,218	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	11,413	SY	\$14.50	\$165,493	022-308-0200	98 Site p. 53
Install 3" binder course	11,413	SY	\$5.30	\$60,491	025-104-0160	98 Site p. 67
Install 1" wearing course	11,413	SY	\$2.23	\$25,452	025-104-0300	98 Site p. 68
Compaction of asphalt surface	1,268	CY	\$0.47	\$596	025-226-5020	
Total					\$266,106	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Paint markings						
Paint crosswalk (Thermoplastic paint)	1,000	LF	\$1.17	\$1,170	025-804-0730	97 Site
Layout of directional arrows	400	SF	\$4.61	\$1,844	025-804-0760	97 Site
Paint directional arrows	400	SF	\$4.61	\$1,844	025-804-0760	97 Site
Layout of pavement marking	8,560	LF	\$0.04	\$342	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	8,560	LF	\$0.80	\$6,848	025-804-0710	98 Site p. 75
Total					\$12,049	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	311	CY	\$4.97	\$1,544	022-254-0500	97 Site
Install curb and gutter	4,280	LF	\$8.90	\$38,092	025-025-0448	97 Site
Install catch basins	43	EA	\$1,535.00	\$66,005	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	4,708	LF	\$5.30	\$24,952	027-108-3020	97 Site p. 87
Total					\$130,594	
Install sidewalks						
Install sidewalk	1,220	LF	\$10.50	\$12,810	A12.7-140-1580	97 Assemblies p. 421
Total					\$12,810	
Install trees and sod next to sidewalk						
Hauling of fill	90	CY	\$23.00	\$2,079	022-266-0560	97 Site p. 46
Spread fill material	90	CY	\$1.40	\$127	022-262-0010	97 Site p. 46
Install sod	7	MSF	\$505.00	\$3,535	029-316-0300	97 Site p. 116
Install trees and pit	20	EA	\$100.07	\$2,001	A12.7-421-0000/ R029-540	97 Site
Total					\$7,741	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	
Install reflective street signs						
Install new signs	6	EA	\$97.00	\$582	104-304-4900	97 Site
Excavate for new posts	2	CY	\$4.48	\$9	022-254-0060	97 Site
Concrete for new posts	2	CY	\$520.00	\$1,089	033-130-1520	97 Site
Total					\$1,680	
Install street lights						
Install street lights 400 watt	11	EA	\$2,085.00	\$22,935	A12.7-500-2330	
Total					\$22,935	
adjustment				-\$34,440		
SUBTOTAL				\$450,352		
City cost index	85.9%					
TOTAL				\$386,852		
TOTAL with contingency of:	10%			\$425,537		
TOTAL with contingency of:	30%			\$502,908		
ROUNDED TO				\$426,000		
ROUNDED TO				\$503,000		

Table C.89. Upgrade Westside of Koreans.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Repair and expand parking lot						
Cut soil for new parking lot	11,470	CY	\$1.64	\$18,811	022-242-2000	96 Site & Work
Grade soil	34,411	SY	\$0.72	\$24,776	025-122-1020	98 Site p. 69
Install and compact 6" base material	34,411	SY	\$9.75	\$335,508	022-308-0100	98 Site p. 53
Install new 6" nr concrete	34,411	SY	\$12.35	\$424,977	025-120-0020	98 Site p. 68
Removals for repair of existing concrete	9,690	SF	\$8.65	\$83,819	020-704-0250	98 Site p. 30
Patch existing concrete	1,077	CY	\$23.75	\$25,571	025-120-0510	98 Site p. 68
Total					\$913,462	
Paint markings						
Layout of crosswalk	500	LF	\$0.04	\$20	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of directional arrows	50	SF	\$4.61	\$231	025-804-0760	97 Site
Paint directional arrows	50	SF	\$4.61	\$231	025-804-0760	97 Site
Layout of pavement marking	120,661	LF	\$0.04	\$4,826	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	120,661	LF	\$0.80	\$96,529	025-804-0710	98 Site p. 75
Total					\$102,421	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	1,200	CY	\$4.97	\$5,964	022-254-0500	97 Site
Install catch basins	5	EA	\$1,535.00	\$7,313	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	1,980	LF	\$5.30	\$10,494	027-108-3020	97 Site p. 87
Total					\$23,771	
Install trees and sod next to sidewalk						
Lawn & Ground Cover	21	MSF	\$454.50	\$9,545	A12.7-411-1080	98 Site
Install trees and pit	88	EA	\$50.59	\$4,452	A12.7-421-1220	98 Site
Total					\$13,996	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	69	EA	\$2,085.00	\$143,865	A12.7-500-2330	98 Site p. 409
Total					\$143,865	
Disposal fee for debris						
Rubbish handling	12,853	CY	\$13.30	\$170,940	020-620-3080	97 Site
Haul debris to dump	12,853	CY	\$6.30	\$80,971	020-620-5000	97 Site p. 29
Disposal fee for debris	12,853	CY	\$6.00	\$77,116	020-612-0320	97 Site
Total					\$329,027	
adjustment				-\$158,981		
SUBTOTAL				\$1,368,682		
City cost index	85.9%					
TOTAL				\$1,175,698		
TOTAL with contingency of:	10%			\$1,293,267		
TOTAL with contingency of:	30%			\$1,528,407		
ROUNDED TO				\$1,293,000		
ROUNDED TO				\$1,528,000		

Table C.90. Construct parking Southside Koreans.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new parking lot						
Cut soil for new parking lot	10,696	CY	\$1.64	\$17,541	022-242-2000	96 Site & Work
Grade soil	42,783	SY	\$0.72	\$30,804	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	42,783	SY	\$9.75	\$417,138	022-308-0100	98 Site p. 53
Install 3" binder course	42,783	SY	\$5.30	\$226,752	025-104-0160	98 Site p. 67
Install 1" wearing course	42,783	SY	\$2.23	\$95,407	025-104-0300	98 Site p. 68
Compaction of asphalt surface	4,754	CY	\$0.47	\$2,234	025-226-5020	
Total					\$789,875	
Chip seal existing road segments						
Sweep and remove debris	79	MSF	\$2.15	\$170	029-710-6420	97 Site p. 119
Repair potholes & damages (10% of existing)	440	SY	\$12.90	\$5,681	029-710-5913	97 Site p. 119
Install chip seal	8,808	SY	\$3.39	\$29,860	025-458-2350	97 Site p. 68
Total					\$35,712	
Paint markings						
Layout of crosswalk	1,000	LF	\$0.04	\$40	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	1,000	LF	\$1.17	\$1,170	025-804-0730	97 Site
Layout of directional arrows	100	SF	\$4.61	\$461	025-804-0760	97 Site
Paint directional arrows	100	SF	\$4.61	\$461	025-804-0760	97 Site
Layout of pavement marking	37,520	LF	\$0.04	\$1,501	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	37,520	LF	\$0.80	\$30,016	025-804-0710	98 Site p. 75
Total					\$33,649	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	3,812	CY	\$4.97	\$18,943	022-254-0500	97 Site
Install curb and gutter	4,950	LF	\$8.90	\$44,055	025-025-0448	97 Site
Install catch basins	11	EA	\$1,535.00	\$16,885	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	1,210	LF	\$5.30	\$6,413	027-108-3020	97 Site p. 87
Total					\$86,296	
Install trees and sod next to sidewalk						
New Lawn & Ground Cover	20	MSF	\$454.50	\$8,999	A12.7-411-1080	98 Site
Install trees and pit	83	EA	\$50.59	\$4,174	A12.7-421-1220	98 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$13,173	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	2	CY	\$4.48	\$8	022-254-0060	97 Site
Concrete for new posts	2	CY	\$520.00	\$924	033-130-1520	97 Site
Total					\$1,552	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
Install street lights						
Install street lights 400 watt	11	EA	\$2,085.00	\$22,935	A12.7-500-2330	98 Site p. 409
Total					\$22,935	
Disposal fee for debris						
Rubbish handling	14,521	CY	\$13.30	\$193,129	020-620-3080	97 Site
Haul debris to dump	14,521	CY	\$6.30	\$91,482	020-620-5000	97 Site p. 29
Disposal fee for debris	14,521	CY	\$6.00	\$87,126	020-612-0320	97 Site
Total					\$371,736	
adjustment				-\$39,900		
SUBTOTAL				\$1,317,269		
City cost index	85.9%					
TOTAL				\$1,131,534		
TOTAL with contingency of:	10%			\$1,244,687		
TOTAL with contingency of:	30%			\$1,470,994		
ROUNDED TO				\$1,245,000		
ROUNDED TO				\$1,471,000		

Table C.91. Remove road East section of F Street and East section of D Street (estimate for each of these projects).

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
existing road removal						
<i>Demolition</i>						
Remove top soil	155	CY	\$0.93	\$144	029-204-1400	98 Site p. 116
Remove existing road	1,392	SY	\$6.10	\$8,491	020-554-1750	98 Site p. 28
Rubbish handling	464	CY	\$14.40	\$6,682	020-620-3080	98 Site p. 29
Haul debris to dump	464	CY	\$12.80	\$5,939	020-620-5000	98 Site p. 29
Disposal fee for debris	464	CY	\$6.00	\$2,784		
Total					\$24,040	
<i>Install sidewalks</i>						
Install sidewalk	696	LF	\$10.50	\$7,308	A12.7-140-1580	97 Assemblies p. 421
Total					\$7,308	
<i>Install trees and sod next to sidewalk</i>						
Hauling of fill	189	CY	\$23.00	\$4,348	022-266-0560	97 Site p. 46
Spread fill material	189	CY	\$1.40	\$265	022-262-0010	97 Site p. 46
Install sod	31	MSF	\$505.00	\$15,655	029-316-0300	97 Site p. 116
Install trees and pit	12	EA	\$100.07	\$1,201	A12.7-421-0000/R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$21,468	
<i>Install street lights</i>						
Install street lights 400 watt	3	EA	\$2,085.00	\$6,255	A12.7-500-2330	
Total					\$6,255	
adjustment				-\$27,723		
SUBTOTAL				\$31,348		
City cost index	85.9%					
TOTAL				\$26,928		
TOTAL with contingency of:	10%			\$29,621		
TOTAL with contingency of:	30%			\$35,006		
<u>ROUNDED TO</u>				<u>\$30,000</u>		
<u>ROUNDED TO</u>				<u>\$35,000</u>		

Table C.92. Remove road East section of E Street.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
existing road removal						
<i>Demolition</i>						
Remove top soil	258	CY	\$0.93	\$240	029-204-1400	98 Site p. 116
Remove existing road	2,320	SY	\$6.10	\$14,152	020-554-1750	98 Site p. 28
Rubbish handling	773	CY	\$14.40	\$11,136	020-620-3080	98 Site p. 29
Haul debris to dump	773	CY	\$12.80	\$9,899	020-620-5000	98 Site p. 29
Disposal fee for debris	773	CY	\$6.00	\$4,640		
Total					\$40,066	
<i>Install sidewalks</i>						
Install sidewalk	696	LF	\$10.50	\$7,308	A12.7-140-1580	97 Assemblies p. 421
Total					\$7,308	
<i>Install trees and sod next to sidewalk</i>						
Hauling of fill	189	CY	\$23.00	\$4,348	022-266-0560	97 Site p. 46
Spread fill material	189	CY	\$1.40	\$265	022-262-0010	97 Site p. 46
Install sod	31	MSF	\$505.00	\$15,655	029-316-0300	97 Site p. 116
Install trees and pit	12	EA	\$100.07	\$1,201	A12.7-421-0000/R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$21,468	
<i>Install street lights</i>						
Install street lights 400 watt	3	EA	\$2,085.00	\$6,255	A12.7-500-2330	
Total					\$6,255	
adjustment				-\$27,723		
SUBTOTAL				\$47,374		
City cost index	85.9%					
TOTAL				\$40,695		
TOTAL with contingency of:	10%			\$44,764		
TOTAL with contingency of:	30%			\$52,903		
ROUNDED TO				\$45,000		
ROUNDED TO				\$53,000		

Table C.93. Estimate to demolish each of the following: 5th Street between C and E Street, 3rd Street between C and E Street, 5th Street between G and E Street, and 3rd Street between G and E Street.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Existing road removal						
<i>Demolition</i>						
Remove top soil	105	CY	\$0.93	\$98	029-204-1400	98 Site p. 116
Remove existing road	944	SY	\$6.10	\$5,761	020-554-1750	98 Site p. 28
Rubbish handling	315	CY	\$14.40	\$4,533	020-620-3080	98 Site p. 29
Haul debris to dump	315	CY	\$12.80	\$4,030	020-620-5000	98 Site p. 29
Disposal fee for debris	315	CY	\$6.00	\$1,889		
Total					\$16,311	
<i>Install sidewalks</i>						
Install sidewalk	425	LF	\$10.50	\$4,463	A12.7-140-1580	97 Assemblies p. 421
Total					\$4,463	
<i>Install trees and sod next to sidewalk</i>						
Hauling of fill	210	CY	\$23.00	\$4,827	022-266-0560	97 Site p. 46
Spread fill material	210	CY	\$1.40	\$294	022-262-0010	97 Site p. 46
Install sod	34	MSF	\$505.00	\$17,170	029-316-0300	97 Site p. 116
Install trees and pit	7	EA	\$100.07	\$700	A12.7-421-0000/R029-540	97 Site
Total					\$22,991	
<i>Install street lights</i>						
Install street lights 400 watt	2	EA	\$2,085.00	\$4,170	A12.7-500-2330	
Total					\$4,170	
adjustment				-\$27,161		
SUBTOTAL				\$20,773		
City cost index	85.9%					
TOTAL				\$17,844		
TOTAL with contingency of:	10%			\$19,628		
TOTAL with contingency of:	30%			\$23,197		
<u>ROUNDED TO</u>				<u>\$20,000</u>		
<u>ROUNDED TO</u>				<u>\$23,000</u>		

Table C.94. Construct new road from Gate 15 to 2nd Street and redo Gate 21 entrance.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	8,025	CY	\$1.64	\$13,161	022-242-2000	96 Site & Work
Grade soil	24,075	SY	\$0.72	\$17,334	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	24,075	SY	\$14.40	\$346,675	022-308-0200	98 Site p. 53
Install 3" binder course	24,075	SY	\$5.30	\$127,596	025-104-0160	98 Site p. 67
Install 1" wearing course	24,075	SY	\$2.23	\$53,687	025-104-0300	98 Site p. 68
Compaction of asphalt surface	2,675	CY	\$0.47	\$1,257	025-226-5020	
Total					\$559,709	
Paint markings						
Paint crosswalk (Thermoplastic paint)	750	LF	\$1.17	\$878	025-804-0730	97 Site
Layout of directional arrows	75	SF	\$4.61	\$346	025-804-0760	97 Site
Paint directional arrows	75	SF	\$4.61	\$346	025-804-0760	97 Site
Layout of pavement marking	22,570	LF	\$0.04	\$903	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	22,570	LF	\$0.80	\$18,056	025-804-0710	98 Site p. 75
Total					\$20,528	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	655	CY	\$4.97	\$3,258	022-254-0500	97 Site
Install curb and gutter	9,028	LF	\$8.90	\$80,349	025-025-0448	97 Site
Install catch basins	90	EA	\$1,535.00	\$138,150	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	9,931	LF	\$5.30	\$52,633	027-108-3020	97 Site p. 87
Total					\$274,390	
Install sidewalks						
Install sidewalk	9,028	LF	\$10.50	\$94,794	A12.7-140-1580	97 Assemblies p. 421
Total					\$94,794	
Install trees and sod next to sidewalk						
Hauling of fill	669	CY	\$23.00	\$15,381	022-266-0560	97 Site p. 46
Spread fill material	669	CY	\$1.40	\$936	022-262-0010	97 Site p. 46
Install sod	54	MSF	\$505.00	\$27,270	029-316-0300	97 Site p. 116
Install trees and pit	226	EA	\$100.07	\$22,616	A12.7-421-0000/ R029-540	97 Site
Total					\$66,203	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	23	EA	\$2,085.00	\$47,955	A12.7-500-2330	
Total					\$47,955	
adjustment				-\$116,320		
SUBTOTAL				\$949,421		
City cost index	85.9%					
TOTAL				\$815,553		
TOTAL with contingency of:	10%			\$897,108		
TOTAL with contingency of:	30%			\$1,060,219		
ROUNDED TO				\$897,000		
ROUNDED TO				\$1,060,000		

Table C.95. Upgrade 2nd Street.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
existing road removal						
<i>Demolition</i>						
Remove top soil	267	CY	\$0.93	\$248	029-204-1400	98 Site p. 116
Remove existing road	2,404	SY	\$6.10	\$14,667	020-554-1750	98 Site p. 28
Rubbish handling	801	CY	\$14.40	\$11,541	020-620-3080	98 Site p. 29
Haul debris to dump	801	CY	\$12.80	\$10,259	020-620-5000	98 Site p. 29
Disposal fee for debris	801	CY	\$6.00	\$4,809		
Total					\$41,525	
<i>Remove existing sidewalk and curb and gutter</i>						
Remove curb and gutter	2,164	LF	\$3.91	\$8,461	020-554-2500	98 Site p. 28
Rubbish handling	143	CY	\$14.40	\$2,057	020-620-3080	98 Site p. 29
Haul debris to dump	143	CY	\$12.80	\$1,828	020-620-5000	98 Site p. 29
Disposal fee for debris	143	CY	\$6.00	\$857		
Total					\$13,203	
<i>Install new road</i>						
Cut soil for new road	2,113	CY	\$1.64	\$3,465	022-242-2000	96 Site & Work
Grade soil	5,771	SY	\$0.72	\$4,155	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	5,771	SY	\$14.50	\$83,675	022-308-0200	98 Site p. 53
Install 3" binder course	5,771	SY	\$5.30	\$30,585	025-104-0160	98 Site p. 67
Install 1" wearing course	5,771	SY	\$2.23	\$12,869	025-104-0300	98 Site p. 68
Compaction of asphalt surface	641	CY	\$0.47	\$301	025-226-5020	
Total					\$135,049	
<i>Paint markings</i>						
Paint crosswalk (Thermoplastic paint)	2,000	LF	\$1.17	\$2,340	025-804-0730	97 Site
Layout of directional arrows	100	SF	\$4.61	\$461	025-804-0760	97 Site
Paint directional arrows	100	SF	\$4.61	\$461	025-804-0760	97 Site
Layout of pavement marking	5,410	LF	\$0.04	\$216	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	5,410	LF	\$0.80	\$4,328	025-804-0710	98 Site p. 75
Total					\$7,807	
<i>Install new curb & gutter plus catch basin</i>						
Excavate for curb and gutter	157	CY	\$4.97	\$781	022-254-0500	97 Site
Install curb and gutter	2,164	LF	\$8.90	\$19,260	025-025-0448	97 Site
Install catch basins	22	EA	\$1,535.00	\$33,770	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	2,380	LF	\$5.30	\$12,616	027-108-3020	97 Site p. 87
Total					\$66,427	
<i>Install sidewalks</i>						
Install sidewalk	2,164	LF	\$10.50	\$22,722	A12.7-140-1580	97 Assemblies p. 421
Total					\$22,722	
<i>Install trees and sod next to sidewalk and in median</i>						
Hauling of fill	107	CY	\$23.00	\$2,458	022-266-0560	97 Site p. 46
Spread fill material	107	CY	\$1.40	\$150	022-262-0010	97 Site p. 46
Install sod	9	MSF	\$505.00	\$4,545	029-316-0300	97 Site p. 116
Install trees and pit	18	EA	\$100.07	\$1,801	A12.7-421-0000/ R029-540	97 Site
Total					\$8,954	
<i>Install traffic control directional signs</i>						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,084	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
Install street lights						
Remove and reinstall poles & lights	5	EA	\$532.00	\$2,660	CERL estimate	
Total					\$2,660	
adjustment				-\$15,938		
SUBTOTAL				\$286,732		
City cost index	85.9%					
TOTAL				\$246,303		
TOTAL with contingency of:	10%			\$270,934		
TOTAL with contingency of:	30%			\$320,194		
ROUNDED TO				\$271,000		
ROUNDED TO				\$320,000		

Table C.96. Construction of new road from 23rd & G to 10th.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	5,132	CY	\$1.64	\$8,416	022-242-2000	96 Site & Work
Grade soil	15,396	SY	\$0.72	\$11,085	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	15,396	SY	\$14.50	\$223,242	022-308-0200	98 Site p. 53
Install 3" binder course	13,685	SY	\$5.30	\$72,532	025-104-0160	98 Site p. 67
Install 1" wearing course	13,685	SY	\$2.23	\$30,518	025-104-0300	98 Site p. 68
Compaction of asphalt surface	1,521	CY	\$0.47	\$715	025-226-5020	
Total					\$346,509	
Paint markings						
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of pavement marking	12,830	LF	\$0.04	\$513	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	12,830	LF	\$0.80	\$10,264	025-804-0710	98 Site p. 75
Total					\$11,362	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	373	CY	\$4.97	\$1,852	022-254-0500	97 Site
Install curb and gutter	5,132	LF	\$8.90	\$45,675	025-025-0448	97 Site
Install catch basins	51	EA	\$1,535.00	\$78,285	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	5,645	LF	\$5.30	\$29,920	027-108-3020	97 Site p. 87
Total					\$155,731	
Install sidewalks						
Install sidewalk	5,132	LF	\$10.50	\$53,886	A12.7-140-1580	97 Assemblies p. 421
Total					\$53,886	
Install trees and sod next to sidewalk						
Hauling of fill	253	CY	\$23.00	\$5,829	022-266-0560	97 Site p. 46
Spread fill material	253	CY	\$1.40	\$355	022-262-0010	97 Site p. 46
Install sod	21	MSF	\$505.00	\$10,605	029-316-0300	97 Site p. 116
Install trees and pit	86	EA	\$100.07	\$8,606	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$25,395	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	13	EA	\$2,085.00	\$27,105	A12.7-500-2330	
Total					\$27,105	
adjustment				-\$54,662		
SUBTOTAL				\$567,488		
City cost index	85.9%					
TOTAL				\$487,472		
TOTAL with contingency of:	10%			\$536,220		
TOTAL with contingency of:	30%			\$633,714		
<u>ROUNDED TO</u>				<u>\$536,000</u>		
<u>ROUNDED TO</u>				<u>\$634,000</u>		
Ph3-3a Roads on Western side of installation						
SOW: Construction of new road from 23rd & G to 10th						
Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new road						
Cut soil for new road	5,132	CY	\$1.64	\$8,416	022-242-2000	96 Site & Work
Grade soil	15,396	SY	\$0.72	\$11,085	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	15,396	SY	\$14.50	\$223,242	022-308-0200	98 Site p. 53
Install 3" binder course	13,685	SY	\$5.30	\$72,532	025-104-0160	98 Site p. 67
Install 1" wearing course	13,685	SY	\$2.23	\$30,518	025-104-0300	98 Site p. 68
Compaction of asphalt surface	1,521	CY	\$0.47	\$715	025-226-5020	
Total					\$346,509	
Paint markings						
Layout of crosswalk	2	LF	\$0.04	\$0.08	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of pavement marking	12,830	LF	\$0.04	\$513	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	12,830	LF	\$0.80	\$10,264	025-804-0710	98 Site p. 75
Total					\$11,362	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	373	CY	\$4.97	\$1,852	022-254-0500	97 Site
Install curb and gutter	5,132	LF	\$8.90	\$45,675	025-025-0448	97 Site
Install catch basins	51	EA	\$1,535.00	\$78,285	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	5,645	LF	\$5.30	\$29,920	027-108-3020	97 Site p. 87
Total					\$155,731	
Install sidewalks						
Install sidewalk	5,132	LF	\$10.50	\$53,886	A12.7-140-1580	97 Assemblies p. 421
Total					\$53,886	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install trees and sod next to sidewalk						
Hauling of fill	253	CY	\$23.00	\$5,829	022-266-0560	97 Site p. 46
Spread fill material	253	CY	\$1.40	\$355	022-262-0010	97 Site p. 46
Install sod	21	MSF	\$505.00	\$10,605	029-316-0300	97 Site p. 116
Install trees and pit	86	EA	\$100.07	\$8,606	A12.7-421-0000/ R029-540	97 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$25,395	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028- 412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	13	EA	\$2,085.00	\$27,105	A12.7-500-2330	
Total					\$27,105	
adjustment				-\$54,662		
SUBTOTAL				\$567,488		
City cost index	85.9%					
TOTAL				\$487,472		
TOTAL with contingency of:	10%			\$536,220		
TOTAL with contingency of:	30%			\$633,714		
ROUNDED TO				\$536,000		
ROUNDED TO				\$634,000		

Table C.97. Construction of new parking lot in demo typ 20 area.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Repair and expand parking lot						
Cut soil for new parking lot	20,145	CY	\$1.64	\$33,037	022-242-2000	96 Site & Work
Grade soil	60,434	SY	\$0.72	\$43,512	025-122-1020	98 Site p. 69
Install and compact 6" base material	60,434	SY	\$9.75	\$589,232	022-308-0100	98 Site p. 53
Install new 6" nr concrete	60,434	SY	\$12.35	\$746,360	025-120-0020	98 Site p. 68
removals for repair of existing concrete	0	SF	\$8.65	\$0	020-704-0250	98 Site p. 30
patch existing concrete	0	CY	\$23.75	\$0	025-120-0510	98 Site p. 68
Total					\$1,412,141	
Paint markings						
Layout of crosswalk	500	LF	\$0.04	\$20	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	500	LF	\$1.17	\$585	025-804-0730	97 Site
Layout of directional arrows	50	SF	\$4.61	\$231	025-804-0760	97 Site
Paint directional arrows	50	SF	\$4.61	\$231	025-804-0760	97 Site
Layout of pavement marking	32,357	LF	\$0.04	\$1,294	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	32,357	LF	\$0.80	\$25,886	025-804-0710	98 Site p. 75
Total					\$28,246	
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	470	CY	\$4.97	\$2,335	022-254-0500	97 Site
Install curb and gutter	6,472	LF	\$8.90	\$57,601	025-025-0448	97 Site
Install catch basins	25	EA	\$1,535.00	\$38,641	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	2,977	LF	\$5.30	\$15,776	027-108-3020	97 Site p. 87
Total					\$114,353	
Install sidewalks						
Install trees and sod next to sidewalk						
Lawn & Ground Cover	26	MSF	\$454.50	\$11,817	A12.7-411-1080	98 Site
Install trees and pit	108	EA	\$50.59	\$5,464	A12.7-421-1220	98 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$25,079	
Install traffic control directional signs						
Install new signs	4	EA	\$77.50	\$310	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,042	
Install reflective street signs						
Install new signs	4	EA	\$97.00	\$388	104-304-4900	97 Site
Excavate for new posts	1	CY	\$4.48	\$6	022-254-0060	97 Site
Concrete for new posts	1	CY	\$520.00	\$726	033-130-1520	97 Site
Total					\$1,120	
Install street lights						
Install street lights 400 watt	86	EA	\$2,085.00	\$179,310	A12.7-500-2330	98 Site p. 409
Total					\$179,310	
Disposal fee for debris						
Rubbish handling	20,617	CY	\$13.30	\$274,210	020-620-3080	97 Site
Haul debris to dump	20,617	CY	\$6.30	\$129,889	020-620-5000	97 Site p. 29
Disposal fee for debris	20,617	CY	\$6.00	\$123,704	020-612-0320	97 Site
Total					\$527,804	
adjustment				-\$206,551		
SUBTOTAL				\$2,082,544		
City cost index	85.9%					
TOTAL				\$1,788,906		
TOTAL with contingency of:	10%			\$1,967,796		
TOTAL with contingency of:	30%			\$2,325,577		
ROUNDED TO				\$1,968,000		
ROUNDED TO				\$2,326,000		

Table C.98. Repair existing parking lot Gate 1.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Demolition						
Remove damaged curb and gutter	309	LF	\$3.28	\$1,014	020-554-2400	97 Site p. 28
Rubbish handling	20	CY	\$13.30	\$271	020-620-3080	97 Site
Haul debris to dump	20	CY	\$6.30	\$128	020-620-5000	97 Site p. 29
Disposal fee for debris	20	CY	\$6.00	\$122	020-612-0320	97 Site p. 29
Total					\$1,536	
Install new curb and gutter						
Excavate for curb and gutter	22	CY	\$4.97	\$111	022-254-0500	97 Site
Install curb and gutter	309	LF	\$8.90	\$2,750	025-025-0448	97 Site
Install catch basins	5	EA	\$1,535.00	\$7,266	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	1,320	LF	\$5.30	\$6,996	027-108-3020	97 Site p. 87
					\$17,123	
Chip seal existing parking lots						
Sweep and remove debris	264	MSF	\$2.15	\$568	029-710-6420	97 Site p. 119
Repair potholes & damages (10% of existing)	4,400	SY	\$12.90	\$56,760	029-710-5913	97 Site p. 119
Install chip seal	24,933	SY	\$3.39	\$84,524	025-458-2350	97 Site p. 68
Total					\$141,852	
Finish and landscaping						
Layout of parking stalls	35,200	LF	\$0.04	\$1,408	025-804-0790	97 Site p.70
Paint parking stalls (Thermoplastic paint)	880	EA	\$4.39	\$3,863	025-804-0800	97 Site p. 70
Paint parking stalls-handicap stalls	18	EA	\$80.50	\$1,449	025-804-1200	97 Site p. 70
Layout of directional arrows	60	SF	\$4.61	\$277	025-804-0760	97 Site
Install directional arrows	60	SF	\$4.61	\$277	025-804-0760	97 Site
Install sod	2	MSF	\$505.00	\$1,040	029-316-0300	97 Site p. 116
Install trees and pit	34	EA	\$100.07	\$3,402	A12.7-421-0000/ R029-540	97 Site
Total					\$11,716	
SUBTOTAL				\$172,227		
City cost index	86%					
TOTAL				\$147,943		
TOTAL with contingency of:	10%			\$162,737		
TOTAL with contingency of:	30%			\$192,325		
ROUNDED TO				\$163,000		
ROUNDED TO				\$192,000		

Table C.99. Northern perimeter road.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Existing road removal						
<i>Demolition</i>						
Remove top soil	434	CY	\$0.93	\$404	029-204-1400	98 Site p. 116
Remove existing road	3,908	SY	\$6.10	\$23,837	020-554-1750	98 Site p. 28
Rubbish handling	1,303	CY	\$14.40	\$18,757	020-620-3080	98 Site p. 29
Haul debris to dump	1,303	CY	\$12.80	\$16,673	020-620-5000	98 Site p. 29
Disposal fee for debris	1,303	CY	\$6.00	\$7,816		
Total					\$67,487	
SUBTOTAL				\$67,487		
City cost index	86%					
TOTAL				\$57,972		
TOTAL with contingency of:	10%			\$63,769		
TOTAL with contingency of:	30%			\$75,363		
<u>ROUNDED TO</u>				<u>\$64,000</u>		
<u>ROUNDED TO</u>				<u>\$75,000</u>		

Table C.100. Construction of new parking lot between new road and C Street.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new parking lot						
Cut soil for new parking lot	32,000	CY	\$1.64	\$52,480	022-242-2000	96 Site & Work
Grade soil	128,000	SY	\$0.72	\$92,160	025-122-1020	98 Site p. 69
Install and compact crushed stone base material	128,000	SY	\$9.75	\$1,248,000	022-308-0100	98 Site p. 53
Install 3" binder course	128,000	SY	\$5.30	\$678,400	025-104-0160	98 Site p. 67
Install 1" wearing course	128,000	SY	\$2.23	\$285,440	025-104-0300	98 Site p. 68
Compaction of asphalt surface	14,222	CY	\$0.47	\$6,684	025-226-5020	
Total					\$2,363,164	
Chip seal existing road segments						
Sweep and remove debris	79	MSF	\$2.15	\$170	029-710-6420	97 Site p. 119
Repair potholes & damages (10% of existing)	440	SY	\$12.90	\$5,681	029-710-5913	97 Site p. 119
Install chip seal	8,808	SY	\$3.39	\$29,860	025-458-2350	97 Site p. 68
Total					\$35,712	
Paint markings						
Layout of crosswalk	1,000	LF	\$0.04	\$40	025-804-0790	97 Site
Paint crosswalk (Thermoplastic paint)	1,000	LF	\$1.17	\$1,170	025-804-0730	97 Site
Layout of directional arrows	100	SF	\$4.61	\$461	025-804-0760	97 Site
Paint directional arrows	100	SF	\$4.61	\$461	025-804-0760	97 Site
Layout of pavement marking	99,880	LF	\$0.04	\$3,995	025-804-0790	98 Site p. 76
Install pavement marking (Thermoplastic paint)	99,880	LF	\$0.80	\$79,904	025-804-0710	98 Site p. 75
Total					\$86,031	

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install new curb & gutter plus catch basin						
Excavate for curb and gutter	4,019	CY	\$4.97	\$19,976	022-254-0500	97 Site
Install curb and gutter	5,220	LF	\$8.90	\$46,458	025-025-0448	97 Site
Install catch basins	51	EA	\$1,535.00	\$78,592	A12.3-710-5820	97 Site p. 365
Install pipe to connect basins	8,250	LF	\$5.30	\$43,725	027-108-3020	97 Site p. 87
Total					\$188,751	
Install trees and sod next to sidewalk						
Lawn & Ground Cover	21	MSF	\$454.50	\$9,490	A12.7-411-1080	98 Site
Install trees and pit	87	EA	\$50.59	\$4,401	A12.7-421-1220	98 Site
Irrigation system	0	SF	\$0.61	\$0	027-104-0900	97 Site p. 108
Total					\$13,891	
Install traffic control directional signs						
Install new signs	8	EA	\$77.50	\$620	028-412-0600 & 028-412-1600	97 Site
Excavate for new posts	2	CY	\$4.48	\$8	022-254-0060	97 Site
Concrete for new posts	2	CY	\$520.00	\$924	033-130-1520	97 Site
Total					\$1,552	
Install reflective street signs						
Install new signs	8	EA	\$97.00	\$776	104-304-4900	97 Site
Excavate for new posts	3	CY	\$4.48	\$13	022-254-0060	97 Site
Concrete for new posts	3	CY	\$520.00	\$1,451	033-130-1520	97 Site
Total					\$2,240	
Install street lights						
Install street lights 400 watt	12	EA	\$2,085.00	\$25,020	A12.7-500-2330	98 Site p. 409
Total					\$25,020	
Disposal fee for debris						
Rubbish handling	36,034	CY	\$13.30	\$479,246	020-620-3080	97 Site
Haul debris to dump	36,034	CY	\$6.30	\$227,011	020-620-5000	97 Site p. 29
Disposal fee for debris	36,034	CY	\$6.00	\$216,201	020-612-0320	97 Site
Total					\$922,458	
adjustment				-\$42,704		
SUBTOTAL				\$3,596,117		
City cost index	85.9%					
TOTAL				\$3,089,065		
TOTAL with contingency of:	10%			\$3,397,971		
TOTAL with contingency of:	30%			\$4,015,784		
ROUNDED TO				\$3,398,000		
ROUNDED TO				\$4,016,000		

Table C.101. SW-PK-1: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	2,696	LF	\$13.80	\$37,206	A12.3-110-1440	98 Heavy p.330
Install 15" concrete pipe	1,245	LF	\$16.70	\$20,792	027-162-2020	97 Site p. 92
Install pipe bedding	1,245	LF	\$3.38	\$4,208	A12.3-310-1540	98 Heavy p.333
Install 18" concrete pipe	1,206	LF	\$19.80	\$23,879	027-162-2030	97 Site p. 92
Install pipe bedding	1,206	LF	\$3.50	\$4,221	A12.3-310-1580	98 Heavy p.333
Total					\$90,306	
Install oil/water						
Install catch basins	4	EA	\$1,535.00	\$6,140	A12.3-710-5820	97 Site p. 365
Total					\$6,140	
Install manholes						
Install manholes	5	EA	\$1,495.00	\$7,475	A12.3-710-5820	98 Site p. 377
Total					\$7,475	
SUBTOTAL				\$103,921		
City cost index	85.9%					
TOTAL				\$89,268		
TOTAL with contingency of:	10%			\$98,195		
TOTAL with contingency of:	30%			\$116,048		
ROUNDED TO				\$98,000		
ROUNDED TO				\$116,000		

Table C.102. SW-PK-1c: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	1,348	LF	\$13.80	\$18,603	A12.3-110-1440	98 Heavy p.330
Install 12" concrete pipe	623	LF	\$15.70	\$9,773	027-162-2010	97 Site p. 92
Install pipe bedding	623	LF	\$2.03	\$1,264	A12.3-310-1500	98 Heavy p.333
Install 15" concrete pipe	603	LF	\$16.70	\$10,070	027-162-2020	97 Site p. 92
Install pipe bedding	603	LF	\$3.38	\$2,038	A12.3-310-1540	98 Heavy p.333
Total					\$41,748	
Install oil/water						
Install catch basins	1	EA	\$1,535.00	\$1,535	A12.3-710-5820	97 Site p. 365
Total					\$1,535	
Install manholes						
Install manholes	2	EA	\$1,495.00	\$2,990	A12.3-710-5820	98 Site p. 377
Total					\$2,990	
SUBTOTAL				\$46,273		
City cost index	85.9%					
TOTAL				\$39,749		
TOTAL with contingency of:	10%			\$43,724		
TOTAL with contingency of:	30%			\$51,673		
ROUNDED TO				\$44,000		
ROUNDED TO				\$52,000		

Table C.103. SW-PK-2: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	682	LF	\$13.80	\$9,412	A12.3-110-1440	98 Heavy p.330
Install 24" concrete pipe	620	LF	\$29.00	\$17,980	027-162-2040	97 Site p. 92
Install pipe bedding	620	LF	\$5.23	\$3,243	A12.3-310-1640	98 Heavy p.333
Total					\$30,634	
Install oil-water						
Install catch basins	4	EA	\$1,535.00	\$6,140	A12.3-710-5820	97 Site p. 365
Total					\$6,140	
Install manholes						
Install manholes	1	EA	\$1,495.00	\$1,495	A12.3-710-5820	98 Site p. 377
Total					\$1,495	
SUBTOTAL				\$38,269		
City cost index	85.9%					
TOTAL				\$32,873		
TOTAL with contingency of:	10%			\$36,161		
TOTAL with contingency of:	30%			\$42,735		
ROUNDED TO				\$36,000		
ROUNDED TO				\$43,000		

Table C.104. SW-PK-2c: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	682	LF	\$13.80	\$9,412	A12.3-110-1440	98 Heavy p.330
Install 18" concrete pipe	620	LF	\$19.80	\$12,276	027-162-2030	97 Site p. 92
Install pipe bedding	620	LF	\$3.50	\$2,170	A12.3-310-1580	98 Heavy p.333
Total					\$23,858	
Install oil/water						
Install catch basins	1	EA	\$1,535.00	\$1,535	A12.3-710-5820	97 Site p. 365
Total					\$1,535	
Install manholes						
Install manholes	1	EA	\$1,495.00	\$1,495	A12.3-710-5820	98 Site p. 377
Total					\$1,495	
SUBTOTAL				\$26,888		
City cost index	85.9%					
TOTAL				\$23,096		
TOTAL with contingency of:	10%			\$25,406		
TOTAL with contingency of:	30%			\$30,025		
ROUNDED TO				\$25,000		
ROUNDED TO				\$30,000		

Table C.105. SW-PK-3: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	748	LF	\$13.80	\$10,322	A12.3-110-1440	98 Heavy p.330
Install 30" concrete pipe	680	LF	\$55.50	\$37,740	027-162-2050	97 Site p. 92
Install pipe bedding	680	LF	\$5.35	\$3,638	A12.3-310-1660	98 Heavy p.333
Total					\$51,700	
Install oil/water						
Install catch basins	4	EA	\$1,535.00	\$6,140	A12.3-710-5820	97 Site p. 365
Total					\$6,140	
Install manholes						
Install manholes	1	EA	\$1,495.00	\$1,495	A12.3-710-5820	98 Site p. 377
Total					\$1,495	
SUBTOTAL				\$59,335		
City cost index	85.6%					
TOTAL				\$50,791		
TOTAL with contingency of:	10%			\$55,870		
TOTAL with contingency of:	30%			\$66,028		
ROUNDED TO				\$56,000		
ROUNDED TO				\$66,000		

Table C.106. SW-PK-3c: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	748	LF	\$13.80	\$10,322	A12.3-110-1440	98 Heavy p.330
Install 18" concrete pipe	680	LF	\$19.80	\$13,464	027-162-2030	97 Site p. 92
Install pipe bedding	680	LF	\$3.50	\$2,380	A12.3-310-1580	98 Heavy p.333
Total					\$26,166	
Install oil/water						
Install catch basins	4	EA	\$1,535.00	\$6,140	A12.3-710-5820	97 Site p. 365
Total					\$6,140	
Install manholes						
Install manholes	1	EA	\$1,495.00	\$1,495	A12.3-710-5820	98 Site p. 377
Total					\$1,495	
SUBTOTAL				\$33,801		
City cost index	85.9%					
TOTAL				\$29,035		
TOTAL with contingency of:	10%			\$31,939		
TOTAL with contingency of:	30%			\$37,746		
ROUNDED TO				\$32,000		
ROUNDED TO				\$38,000		

Table C.107. SW-PK-4: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	2,976	LF	\$13.80	\$41,062	A12.3-110-1440	98 Heavy p.330
Install 18" concrete pipe	2,705	LF	\$19.80	\$53,559	027-162-2030	97 Site p. 92
Install pipe bedding	2,705	LF	\$3.50	\$9,468	A12.3-310-1580	98 Heavy p.333
Total					\$104,088	
Install oil/water						
Install catch basins	4	EA	\$1,535.00	\$6,140	A12.3-710-5820	97 Site p. 365
Total					\$6,140	
Install manholes						
Install manholes	5	EA	\$1,495.00	\$7,475	A12.3-710-5820	98 Site p. 377
Total					\$7,475	
SUBTOTAL				\$117,703		
City cost index	85.9%					
TOTAL				\$101,107		
TOTAL with contingency of:	10%			\$111,218		
TOTAL with contingency of:	30%			\$131,439		
ROUNDED TO				\$111,000		
ROUNDED TO				\$131,000		

Table C.108. SW-PK-4c: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	1,488	LF	\$13.80	\$20,531	A12.3-110-1440	98 Heavy p.330
Install 15" concrete pipe	1,353	LF	\$16.70	\$22,587	027-162-2020	97 Site p. 92
Install pipe bedding	1,353	LF	\$3.38	\$4,571	A12.3-310-1540	98 Heavy p.333
Total					\$47,689	
Install oil/water						
Install catch basins	1	EA	\$1,535.00	\$1,535	A12.3-710-5820	97 Site p. 365
Total					\$1,535	
Install manholes						
Install manholes	3	EA	\$1,495.00	\$4,485	A12.3-710-5820	98 Site p. 377
Total					\$4,485	
SUBTOTAL				\$53,709		
City cost index	85.6%					
TOTAL				\$45,975		
TOTAL with contingency of:	10%			\$50,573		
TOTAL with contingency of:	30%			\$59,768		
ROUNDED TO				\$51,000		
ROUNDED TO				\$60,000		

Table C.109. SW-PK-5: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	2,202	LF	\$13.80	\$30,390	A12.3-110-1440	98 Heavy p.330
Install 18" concrete pipe	2,002	LF	\$19.80	\$39,640	027-162-2030	97 Site p. 92
Install pipe bedding	2,002	LF	\$3.50	\$7,007	A12.3-310-1580	98 Heavy p.333
Total					\$77,037	
Install oil/water						
Install catch basins	4	EA	\$1,535.00	\$6,140	A12.3-710-5820	97 Site p. 365
Total					\$6,140	
Install manholes						
Install manholes	4	EA	\$1,495.00	\$5,980	A12.3-710-5820	98 Site p. 377
Total					\$5,980	
SUBTOTAL				\$89,157		
City cost index	85.9%					
TOTAL				\$76,586		
TOTAL with contingency of:	10%			\$84,244		
TOTAL with contingency of:	30%			\$99,562		
ROUNDED TO				\$84,000		
ROUNDED TO				\$100,000		

Table C.110. SW-PK-5c: Parking storm sewer lines.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	2,202	LF	\$13.80	\$30,390	A12.3-110-1440	98 Heavy p.330
Install 15" concrete pipe	2,002	LF	\$16.70	\$33,433	027-162-2020	97 Site p. 92
Install pipe bedding	2,002	LF	\$3.38	\$6,767	A12.3-310-1540	98 Heavy p.333
Total					\$70,591	
Install catch basins						
Install catch basins	0	EA	\$1,535.00	\$0	A12.3-710-5820	97 Site p. 365
Total					\$0	
Install manholes						
Install manholes	4	EA	\$1,495.00	\$5,980	A12.3-710-5820	98 Site p. 377
Total					\$5,980	
SUBTOTAL				\$76,571		
City cost index	85.9%					
TOTAL				\$65,774		
TOTAL with contingency of:	10%			\$72,351		
TOTAL with contingency of:	30%			\$85,506		
ROUNDED TO				\$72,000		
ROUNDED TO				\$86,000		

Table C.111. SW-Pipe-1: R&R pipes and structures.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>Regrade and seed area</i>						
Grade Swale to pond	200	LF	\$0.20	\$40	022-702-0010	98 Site p. 55
Erosion control	3,333	SY	\$1.26	\$4,200	022-704-0010	98 Site p. 56
Seed area with grass	30	MSF	\$598.00	\$17,940	A12.7-411-1000	98 Site p. 405
SUBTOTAL				\$22,180		
City cost index	85.9%					
TOTAL				\$19,053		
TOTAL with contingency of:	10%			\$20,958		
TOTAL with contingency of:	30%			\$24,768		
<u>ROUNDED TO</u>				<u>\$21,000</u>		
<u>ROUNDED TO</u>				<u>\$25,000</u>		

Table C.112. SW-Pipe-2: Repair perimeter catch basins.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
<i>R&R catch basins</i>						
R&R Catch basins	3	EA	\$154.00	\$462	022-554-0040	98 Site p. 27
SUBTOTAL				\$462		
City cost index	85.9%					
TOTAL				\$397		
TOTAL with contingency of:	10%			\$437		
TOTAL with contingency of:	30%			\$516		
<u>ROUNDED TO</u>				<u>\$400</u>		
<u>ROUNDED TO</u>				<u>\$500</u>		

Table C.113. SW-Pipe-3: Replace gutter connections to SW on Type 20s.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	4,224	LF	\$2.37	\$10,011	A12.3-110-1310	98 Fac p.962
install 8" plastic tubing	4,224	LF	\$3.27	\$13,812	027-111-0080	98 Site p. 93
Total					\$23,823	
Remove existing pavement, sod, and pipe						
Saw cut pavement	845	LF	\$3.89	\$3,288	020-728-0020	98 Fac p.48
pipe removal 12"	4,224	LF	\$6.15	\$25,978	020-554-2900	98 Site p. 28
Rubbish handling	86	CY	\$14.40	\$1,237	020-620-3080	98 Site p. 29
Haul debris to dump	86	CY	\$12.80	\$1,099	020-620-5000	98 Site p. 29
Disposal fee for debris	86	CY	\$6.00	\$515	CERL estimate	
Total					\$32,116	
Repair roadway						
Install and compact 6" crushed stone base material	94	SY	\$9.75	\$915	022-308-0100	98 Site p. 53
Install 3" binder course	94	SY	\$5.30	\$497	025-104-0160	98 Site p.67
Install 3" wearing course	94	SY	\$6.20	\$582	025-104-0460	98 Site p.68
Compaction of 6" asphalt surface	63	CY	\$0.47	\$29	022-226-5020	96 Site & Work
Install sod	7	MSF	\$505.00	\$3,491	029-316-0300	97 Site p. 116
Total					\$5,515	
SUBTOTAL				\$61,454		
City cost index	85.9%					
TOTAL				\$52,789		
TOTAL with contingency of:	10%			\$58,068		
TOTAL with contingency of:	30%			\$68,626		
ROUNDED TO				\$58,000		
ROUNDED TO				\$69,000		

Table C.114. SW-Future Dev-1: Changes to system in area for future development.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	770	LF	\$13.80	\$10,626	A12.3-110-1440	98 Heavy p.330
Install 60" concrete pipe(requires 54")	700	LF	\$138.00	\$96,600	027-162-2090	98 Heavy p.99
Install pipe bedding	700	LF	\$15.57	\$10,899	A12.3-310-1740	98 Heavy p.333
Install 72" concrete pipe	0	LF	\$184.00	\$0	027-162-22100	98 Heavy p.99
Install pipe bedding	0	LF	\$22.50	\$0	A12.3-310-1760	98 Heavy p.333
Total					\$118,125	
Install headwalls						
Install inlet and outlet	2	EA	\$4,050.00	\$8,100	A12.3-750-2140	98 Site p. 379
Total					\$8,100	
Install manholes						
Install manholes	1	EA	\$1,495.00	\$1,495	A12.3-710-5820	98 Site p. 377
Total					\$1,495	
Install retention pond						
Clear and grub/strip land	1,111	CY	\$0.61	\$678	021-144-0200	97 Site p. 34
Excavate soil	8,889	CY	\$1.00	\$8,889	022-4000	97 Bldg p. 51
Grade soil/shape basin	800	SY	\$0.72	\$576	025-122-1020	97 Site p. 63
Haul in base material/drainage rock	133	CY	\$12.65	\$1,687	A12.1-618-1200	97 Site p. 353
Install base material/drainage rock	133	CY	\$1.40	\$187	022-262-0010	97 Site p. 46
Install grass bottom	30	MSF	\$321.56	\$9,647	A12.7-411-1000	97 Site p. 393
Total					\$21,663	
SUBTOTAL				\$149,383		
City cost index	85.9%					
TOTAL				\$128,320		
TOTAL with contingency of:	10%			\$141,152		
TOTAL with contingency of:	30%			\$166,816		
ROUNDED TO				\$141,000		
ROUNDED TO				\$167,000		

Table C.115. SW-Phase 6: Create retention pond in Western Dunn field and connect to Eastern side.

Action	Quantity	UOM	Cost/unit	Total Cost	Means Ref. No.	Book
Install pipe						
Excavate/backfill trench	1,408	LF	\$13.80	\$19,430	A12.3-110-1440	98 Heavy p.330
Install 48" concrete pipe	1,280	LF	\$105.00	\$134,400	027-162-2080	98 Heavy p.99
Install pipe bedding	1,280	LF	\$12.49	\$15,987	A12.3-310-1720	98 Heavy p.333
Total					\$169,818	
Install headwalls						
Install inlet and outlet	2	EA	\$3,040.00	\$6,080	A12.3-750-2060	98 Site p. 379
Total					\$6,080	
Install manholes						
Install manholes	3	EA	\$1,495.00	\$4,485	A12.3-710-5820	98 Site p. 377
Total					\$4,485	
Install retention pond						
Clear and grub/strip land	556	CY	\$0.61	\$339	021-144-0200	97 Site p. 34
Excavate soil	4,444	CY	\$1.00	\$4,444	022-4000	97 Bldg p. 51
Grade soil/shape basin	500	SY	\$0.72	\$360	025-122-1020	97 Site p. 63
Haul in base material/drainage rock	83	CY	\$12.65	\$1,054	A12.1-618-1200	97 Site p. 353
Install base material/drainage rock	83	CY	\$1.40	\$117	022-262-0010	97 Site p. 46
Install grass bottom	15	MSF	\$321.56	\$4,823	A12.7-411-1000	97 Site p. 393
Total					\$11,138	
SUBTOTAL				\$191,520		
City cost index	85.9%					
TOTAL				\$164,516		
TOTAL with contingency of:	10%			\$180,967		
TOTAL with contingency of:	30%			\$213,871		
ROUNDED TO				\$181,000		
ROUNDED TO				\$214,000		

Distribution

Chief of Engineers 20314-1000

ATTN: CEHEC-IM-LH (2)

ATTN: CEHEC-IM-LP (2)

ATTN: CERD-L

ATTN: CERE-C (3)

ACSIM 20310

ATTN: DAIM-BO (3)

U.S. Army Engineer District,

Mobile

ATTN: CESAM (5)

Defense Technical Info Center 22060-6218

ATTN: DTIC-O (2)

18

5/99